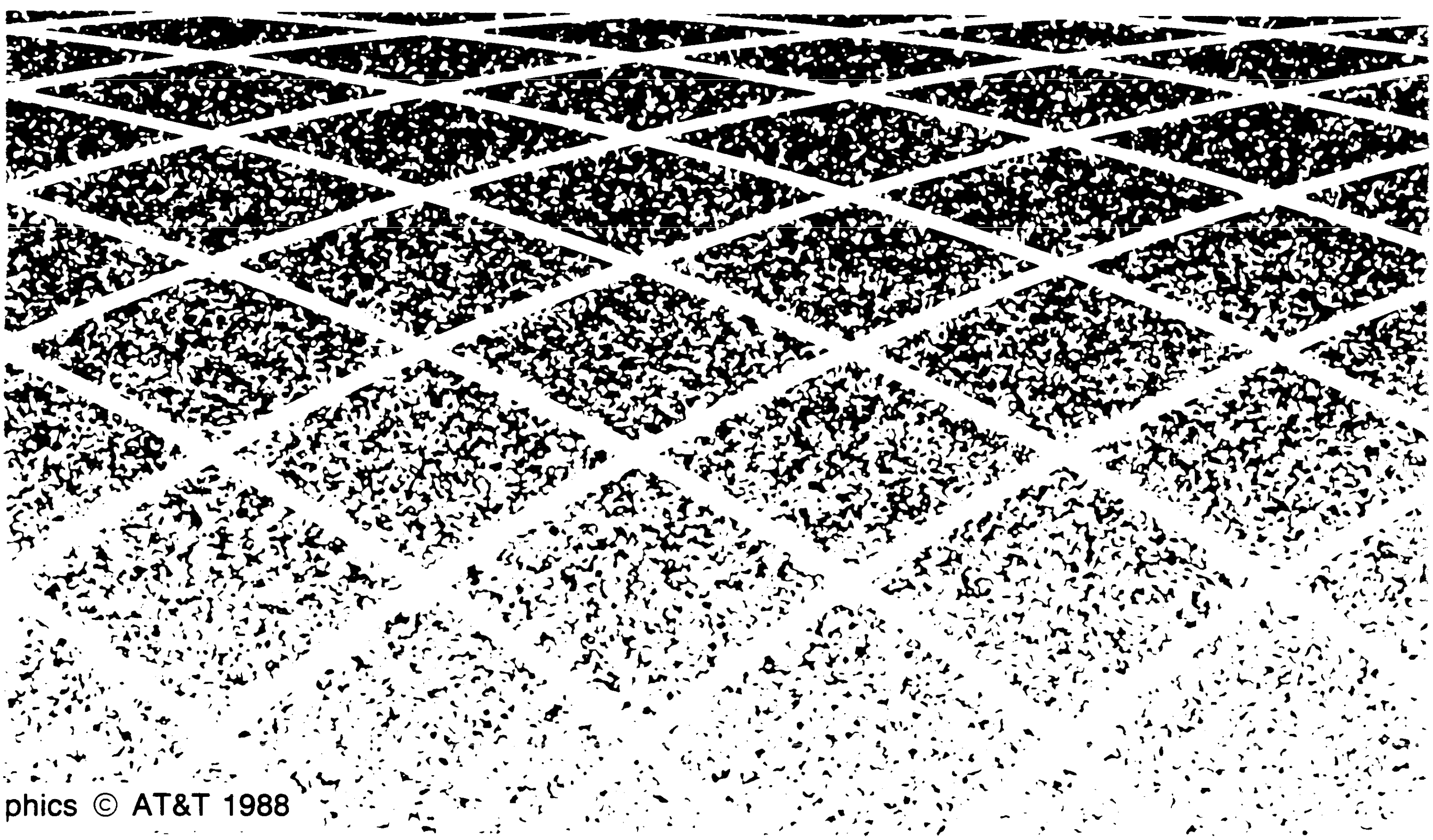
AT&T 555-230-510
Issue 2
July 1992

# DEFINITY® Communications System Generic 3r

## System Reports



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**Class A Statement.** This equipment generates, uses, and can radiate radio-frequency energy and, if not installed and used in accordance with the instruction manual, may cause interference to radio communications. it has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment.

Operation of this equipment in a residential area is likely to cause interference, in which case the user at his/her own expense will be required to take whatever measures may be required to correct the interference.

**Network Registration Number.** This equipment is registered with the FCC under FCC network registration number AS593M-13283-MFE.

**Answer-Supervision Signaling.** Allowing this equipment to be operated in such a manner as to not provide proper answer-supervision signaling is in violation of Part 68 rules. This equipment returns answer-supervision signals to the public switched network when:

- Answered by the called station
- Answered by the attendant
- Routed to a recorded announcement that can be administered by the CPE user.

This equipment returns answer-supervision on all DID calls forwarded back to the public switched telephone network. Permissible exceptions are:

- A call is unanswered
- A busy tone is received
- A reorder tone is received

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## Acknowledgment

This document was prepared by the AT&T Technical Publications Department, Denver CO.

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# About This Document

This document provides a comprehensive description of the system reports that are available with the DEFINITY® Communications System Generic 3r.

This document introduces and defines the concepts and terminology that relate to the various traffic measurements and their associated reports.

## Purpose of System Reports

The traffic measurements and their associated reports are designed to monitor and collect traffic data (also called usage data) for trunk groups, hunt groups, the attendant group, and the queues associated with each of these groups. The system accumulates and stores the traffic data. You can display (and/or print) the traffic data, as an organized report, by issuing the appropriate identifying command from the DEFINITY Communications System Generic 3 Management Terminal (G3-MT).

The system reports and the supporting information contained within this document permit you to:

- Monitor and evaluate system performance
- Monitor security violations data, which identifies illegal attempts to access the system
- Observe usage trends and recommend possible corrective actions, as needed
- Determine the source of performance degradations (for example, processor overload)
- Determine possible trunk problems (for example, blocking level too high)
- Recommend system updates and upgrades, when appropriate

## Who Should Read This Document

This document is intended for:

- System Administrators
- Communications System Managers
- Technicians who resolve certain usage-related customer complaints
- Technicians who plan system expansions and upgrades
- Personnel involved in traffic engineering.

> **NOTE:**
> A thorough knowledge of traffic theory is not required for using the information contained in this document. However, such knowledge is helpful if the desire is to perform in-depth analysis of the traffic data presented in the various reports.

## How This Document is Organized

This document consists of seven chapters, two appendices, a list of abbreviations, and a glossary.

- Chapter 1: How To Enter commands Display Reports, and Print Reports identifies (lists) each traffic command, describes the different types of commands, and describes how to enter a command to display and/or print a report.
- Chapter 2: System Printer and Report-Scheduler describes the Report Scheduler software and how to schedule and print reports on the system printer.
- Chapter 3: Traffic Data Analysis provides detailed descriptions of the traffic measurement reports, excluding processor occupancy and security violations reports.
- Chapter 4: Processor Occupancy Reports describes the purpose of these four reports, when to use each report, how to interpret each report's data, and a list of "Suggested Actions" that maybe taken if a particular field should report data indicating an abnormal condition.
- Chapter 5: Automatic Transmission Measurement System describes the reports from tests that detect signal bss and noise; and singing and echo return bss.
- Chapter 6: Security Violations Reports describes the purpose of these reports and any invalid login attempts detected by the measurements program.
- Chapter 7: References provides an abbreviated listing and description of system documents. Ordering information is also included.

- Appendix A: Blank Worksheets
  - Attendant Group Data Worksheet-used for historical purposes to record the Attendant Group daily measurements for the selected days.
  - ARS Pattern Data Worksheet-used for historical purposes to record the Automatic Route Selection (ARS) Pattern daily measurements for the selected pattern number and days.
  - Hunt Group Data Worksheet—used for historical purposes to record the Hunt Group daily measurements for the selected hunt group and days.
  - Trunk Group Data Worksheet—used for historical purposes to record the Trunk Group daily measurements for the selected trunk group and clays.
  - Processor Occupancy Data Worksheets—used for historical purposes to record the Processor Occupancy daily measurements for the selected days.
  - General Traffic, ACD, and CallVisor® ASAI/OCM Applications—used to calculate the BHCC for complex traffic applications.
- Appendix B: Printer Options
  - AT&T 475 Printer—list the required option switch settings for the AT&T 475 printer.
  - AT&T 572 Printer—lists the required programmable options for the AT&T 572 serial printer.
- List of Abbreviations lists the abbreviations and acronyms used in this document.
- Glossary: contains a list of frequently used terms and their definitions.

## Conventions Used in This Document

This manual uses the following conventions:

- The names of commands are shown in the following typeface:

  change system-parameters feature
- Information you type is shown in the following typeface: *EIA*
- Information displayed on the screen is shown in the following typeface: `login:`
- Keyboard keys are shown as follows: *RETURN*
- Function keys are shown as follows: CANCEL

## Related Documents

The following documents should be consulted for additional specific subject information.

- *DEFINITY® Communications System Generic 1 andGenerk3—System Management, 555-230-500*
- *DEFINITY® Communications System Generic 1* and Generic3—Feature *Description, 555-230-201*
- *DEFINITY® Communications System Generic 1 andGenerb3—System Description and Specifications,* 555-230-200
- *DEFINITY® Communications System Generic 3r — Maintenance, 555-230-105*
- *DEFINITY® Communcations System and System 75 and System 85—DS1/DM1/SDN-PRI Reference, 555-025-101*
- *DEFINITY® Communications System and System 75 and System 85—Traffic Theory, 555-104-504*
- *DEFINITY Communications System and System 75 and System85—Traffic Tables, 555-104-503*
- *DEFINITY® Communications System Generic 3r — Implementation, 555-230-851*
- *DEFINITY® Communications System Generic 1 and Generic 3— Bask Call Management Operations, 555-230-703*

# How to Enter Commands, Display Reports, and Print Reports

1

1

## Commands and the Command Line Format

The DEFINITY® Communications System Generic 3 Management Terminal (G3-MT) is the primary device for issuing commands to the system. Following a successful login procedure, the screen will display `enter command.` If you know it, enter the full and complete desired command. Alternately, you may use HELP to obtain the list of permissible commands. For example, if you type *monitor system* on the command line and press HELP, the following secondary command list is displayed:

view1

view2

The command line consists of three parts. The parts are known as (1 ) the ACTION to be taken, (2) the OBJECT for the specified action, and (3) the QUALIFIER for the specified object. Table 1-1 lists all of the commands that are associated with the traffic measurements.

Table 1-1. Traffic Measurement Commands

| COMMANDS | | |
|---|---|---|
| Action | Object | Qualifier |
| list | measurements attendant | group/position[print or schedule] |
| list | report scheduler | |
| change | report scheduler | |
| remove | report scheduler | |
| list | aca-parameters | [options][print or schedule] |
| list | measurements aca | [print or schedule] |
| display | mess-selection ars | [print or Schedule] |
| change | mess-selection ars | |
| list | measurments route-pattern | pat_no[print or schedule] |
| list | measurements call-rate | [print or schedule] |
| list | measurements call-summary | [print or schedule] |
| display | mess-selecotion coverage | [print or schedule] |
| change | meas-selection coverage-path | |
| list | mess-coverage-path | [starting path ][count (1-100)[yesterday-peak/today-peak/last hour [external][print or schedule] |
| display | mess-selection principal | |
| change | mess-selecotion principal | |
| list | measurements principal | [starting extension/tac][count( 1-100)][last-hour today-peak/yeasterday] [print or schedule] |
| clear | measurements ds1 | NNCSS |
| list | measurements ds1 | NNCSS{print or schedule] |
| list | rneasurements ds1-log | NNCSS[print or schedule] |
| list | measurements ds1-facility summary | NNCSS[print or schedule] |
| list | measurements ds1-facility log | NNCSS[print or schedule] |
| clear | measurements ds1-facility | NNCSS[print or schedule] |
| list | measurements hunt-group | [options] [print or schedule] |
| list | performance hunt-group | [options] [print or schedule] |
| list | measurements modem-pool | [options] [print or schedule] |
| list | performance summary | [options] [print or schedule] |
| monitor | system view1 | |
| monitor | system view2 | |
| list | measurements summary | [print or schedule] |
| list | measurements blockage | pn/sn yesterday—peak/today-peak/last-hour[print or schedule] |
| list | measurements bad-balance | total/intercom/incoming/tandem yesterday-peak/today/last-hour[print or schedule] |
| list | measurements tone-receiver | [options] [print or schedule] |
| change | meas-selection trunk-group | [print or schedule] |
| display | maas-selection trunk-group | [print or schedule] |
| list | measurements trumk-group summary | [option] [print or schedule] |
| list | measurements trunk-group hourly | <gn>[option] [print or schedule] |
| list | performance trunk-group | [option] [print or schedule] |
| list | measurements outage-trunk | [option] [print or schedule] |
| list | measurements cbc-trunk-group | <tgn>last-hour[print or schedule] |

*Continued on next page*

Table 1-1. Traffic Measurement Commands (Continued)

| COMMANDS | | |
|---|---|---|
| ACTION | OBJECT | QUALIFIER |
| monitor | traffic hunt-groups | [option] |
| monitor | traffic trunk-groups | [option] |
| list | measurements occupancy summary | [print or schedule] |
| list | measurements occupancy last-hour | [print or shcedule] |
| list | measurements occupanoy busiest-interval | [print or schedule] |
| list | measurernents occupancy pktint | [prrint or shedule] |
| list | measurements communications-link | xx-yy[print or schedule] |
| clear | measurements occupancy | |
| list | measurements security-violations summary | [print or schedule] |
| list | measurements security-violations detail | [print or schedule] |
| clear | measurements security-violations | |
| monitor | Security-violations | [print] |
| list | testcalls summary | [grp x][to-grp x][count x][print][schedule] |
| list | testcalls detail | [grp x]to-grp x][mem x][to-mem x][prot x][result x]<br>[not-result x][count x][print or schedule] |

## Monitor Commands

Use the monitor command to display real-time status reports. Whenever a status report is displayed on the G3-MT, it is automatically updated every minute. Press CANCEL to cancel the monitor command without logging off. If the status report consists of more than one page, use NEXT PAGE to display any subsequent pages and PREV PAGE to display previous pages.

Ni If you enter the monitor command incorrectly or if the qualifier is not applicable or cannot be measured, a descriptive error message is displayed on the message line. The message line is the bottom line on the screen. Generally, the error message descriptions will provide sufficient clues to ascertain the problem. However, you may press HELP when needed.

## List Commands

Use the list command to obtain historical information for a list of all (or a selected rang of) agents, splits, trunks, processors, systems, etc.

## Display Commands

Use the display command to identify the parameters associated with a specific object/qualifier (for example, the parameters that are being measured).

## Change Commands

Use the change command to alter the group of parameters that are being measured.

## Clear Commands

Use the clear command to remove the measurement data that was generated as the result of an alarm or a system irregularity.

# Displaying Reports

The commands, listed in Table 1-1, and the resulting reports are described in detail in Chapters 3, 4, 5 and 6.

Each of the monitor and list commands, depicted in Table 1-1, results in producing (displaying) a different report on the G3-MT screen. If the command line qualifier print is selected-the report is immediately printed on the slave printer that is associated with the G3-MT. Whenever the command line qualifier schedule is initially executed, the system defaults the report for immediate printing (on the System Printer unless a day and time of day is scheduled) and generates a Job Id. The Job Id is required by the Report Scheduler feature for updating and deleting the schedule of reports. The Report Scheduler, which is described in Chapter 2, is used to administer a time/day schedule for each desired report.

# Screen Format

The on screen format for reports is as follows:

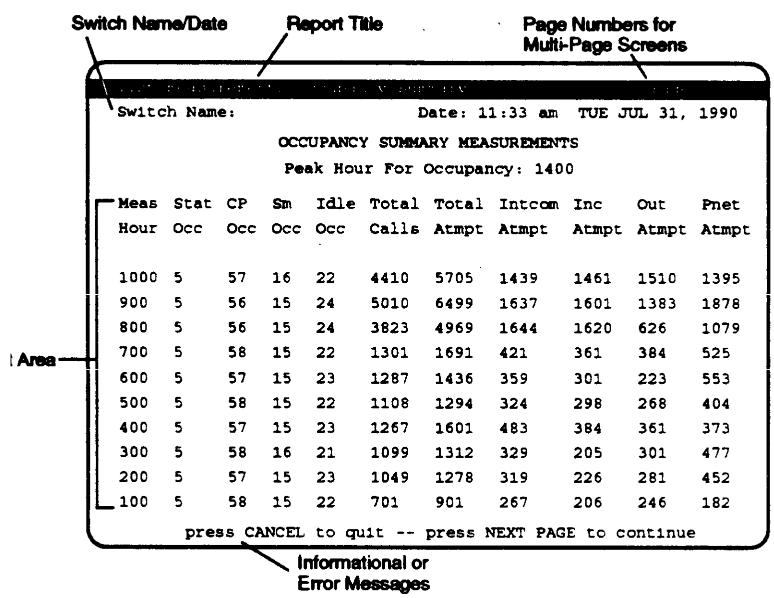


Figure 1-1. Screen Format

An error message is displayed as follows:

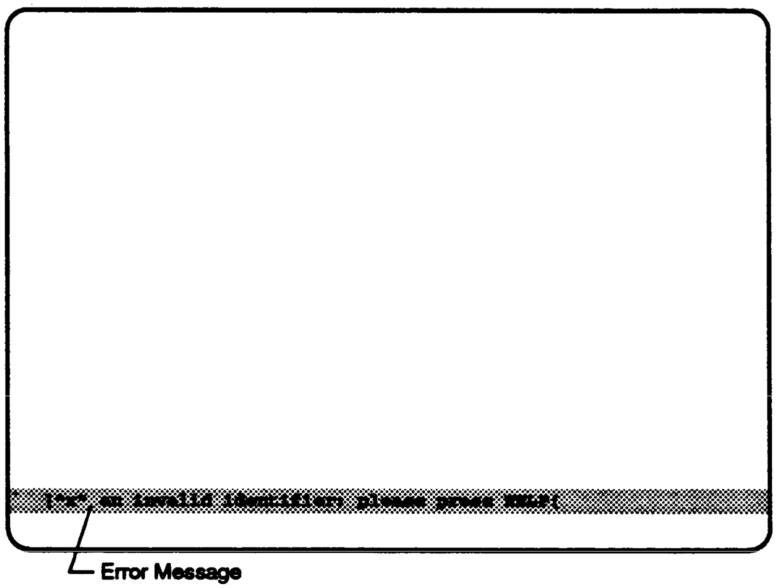


Figure 1-2. Error Message

**When you type a command line it appears as follows:**

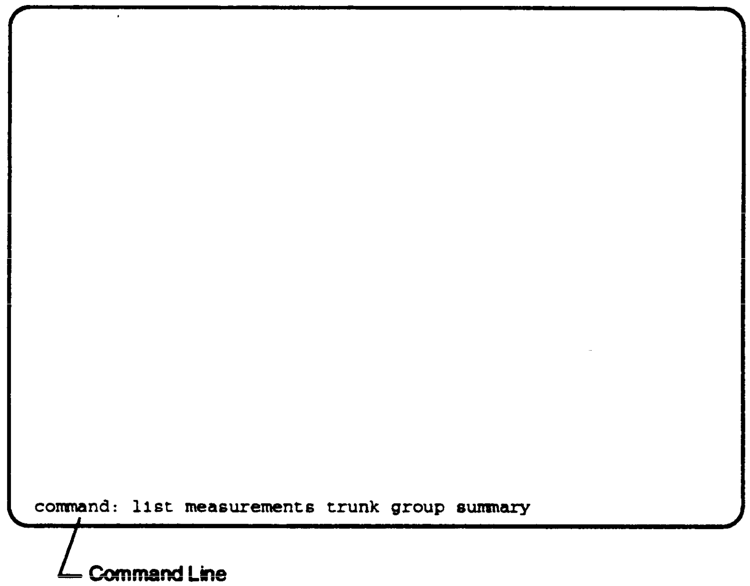


Figure 1-3. Command Line

# System Printer and Report-Scheduler

# 2

2

## System Printer

The system printer, rather than the slave printer that is attached directly to the G3-MT, is used to print those reports that are scheduled. However, when desired and on demand, individual reports may still be printed using the printer that is attached to the G3-MT.

The Report Scheduler feature uses the system printer as its output device. The hardware parameters for the system printer must have been previously administered.

The customer uses Page 4 of the Feature Related System Parameters screen to administer the hardware parameters of the system printer. The system administrator login may access this screen by entering the **change** `system-parameters features` command. Figure 2-1 depicts this screen. Table 2-1 describes the data fields for this screen.

```
change system-parameters features                        Page  4 of 4  SPE A
                        FEATURE-RELATED SYSTEM PARAMETERS

      SYSTEM PRINTER PARAMETERS
                        System Printer Extension: 45206
                                  Lines Per Page: 60
      SYSTEM-WIDE PARAMETERS
                             Switch Name: System Test 2
      CALL MANAGEMENT SYSTEM PARAMETERS
                                        Basic CMS Measurement Interval: hour
                                                    Ajunct CMS Release:
         Automatic Call Distribution (ACD) Log-in Identification Length: 0
       MALICIOUS CALL TRACE PARAMETERS
                                                 Apply MCT Warning Tone? n
                                         MCT Voice Recorder Trunk Group:
```

Figure 2-l. Feature Related System Parameters Screen

**NOTE:**
**The system printer must use an Electronic Industries Association (EIA) RS-232 asynchronousserial interface. The AT&T 475 printeror 572 printer (or compatible) meet these requirements and are recommended for use as the system printer. Depending upon the type modelofserial printer that is used, certain hardware option switch settings may have to be performed as apart of the installation procedure. Appendix B lists the option switch settings for the AT&T 475 pnnter and the programmable settings for the AT&T572 printer.**

Table2-l. System Printer Hardware Administration

| Field | Description |
|---|---|
| system Printer Extension: | Enter the extension number if connected to a switched port. There are two different types of switched port circuits. The TN754 circuit pack supports connections to 7400B-type data modules, while the TN726 circuit pack supports connections to the Asynchronous Data Unit (ADU)-type data module. Local requirements will determine which data link option to select. |
| Lines Per Page: | The number of lines on the computer form. The range is from 24 to 132. Generally, 60 will be the appropriate selection. |

## System Printer Data Link Operation and Maintenance

Operation and maintenance of the system printer data link is significantly different from the SMDR and journal printer data links. For example, the SMDR and journal printer data links are maintained in a constant link up state, while the system printer data link is only brought up once every 15 minutes provided there are reports to be printed, or when an immediate report is scheduled.

The system printer data link has three states that identify its operational condition. The states are: (1) link up, (2) link down, and (3) maintenance busy-out. Whenever the communication path (including software processes, hardware cabling, and printer) functions properly and data is exchanged successfully between them, the data link is defined as being in the link up state. The link down state refers to all times except (1) whenever reports are being printed and (2) whenever maintenance personnel have disabled the link. The maintenance busy-out state is the result of executing the busyout sp-link command from the G3-MT. While in the maintenance busy-out state, the switch software processes are disabled and the link retry operation is disabled.

It is assumed that all customers will monitor the operating status of the system printer and, as necessary, refill the paper bin, relieve any paper jams, verify that the printer is receiving power, etc.

**NOTE:**
A point of clarification is that the BCMS login cannot execute the busyout sp-link command. This is normally only performed via the maintenance login. Therefore, as necessary, all non-maintenance personnel should simply flip the printer power switch to the OFF position to refill the paper bin and remove jammed paper. Subsequently, the system-printer can be restored on-line by turning the power switch ON.

If the system printer link generates either a warning alarm or a minor alarm, the problem should be referred to the proper maintenance personnel.

# Report Scheduler

**The Report Scheduler may be used with many switch features. Specifically, virtually all** list, display, **or** test **commands maybe executed with the** schedule **qualifier. Therefore, the system administrator login, maintenance login, and other logins, may schedule reports.**

**Whenever a command containing the** schedule **option is executed, it generates a Job Id. A maximum of 50 different Job Ids (50 different reports) (can be scheduled for printing. The Report Scheduler feature is used to specify the actual day(s) and time of day that each report will be printed. For a list of measurement commands that can be scheduled, refer to Table 1-1.**

# Print Intervals

**For purposes of printing reports, three print intervals are available:**

- Immediate— **If you select this option, the report will be printed immediately.**
- scheduled— **If you select this option, the date, time, and day(s) parameters for the report, are set administratively. To change them, readministration is required.**
- deferred— **if you select this option, the report will be generated once for the date, time, and day specified.**

## Adding a Report to the Report Scheduler

**To add a report to the Report Scheduler, enter a list, teat, or display command followed by the** schedule **option. Whenever a report is initially scheduled, the print interval of** immediate **is automatically assigned as the default. Therefore, if** immediate **is not desired, the print interval must be changed to** deferred **or** scheduled **and a day and print time must still be added to the Report Scheduler. Figure 2-2 depicts this screen form with sample data. Table 2-2 describes the data fields for this screen.**

```
list measurements attendant-group                                          Page 1
                                   REPORT SCHEDULER
    Job Id: 1                            Job Status: none
    Command: list measurements attendant-group
    Print Interval: immediate
```

Figure 2-2. Report Scheduler Screen

Table 2-2. Report Scheduler Field Descriptions

| Field | Description |
| --- | --- |
| Job Id: | This is a display-only field. Whenever a command is executed with the qualifier schedule, the system responds by generating a unique Job Id number. The Job Id assigned by the system is the lowest number from one to 50 not already used. |
| Job Status: | This is a display-only field. It identifies the print status of the report. Since the job is not yet on the report scheduler, this field displays "none". |
| command : | This is a display-only field. It displays the command line parameters ACTION, OBJECT, and QUALIFIER, of the command being scheduled. |
| Print Interval: | This field has three options: Immediate, deferred, and scheduled. The immediate option is initially assigned as a default. Thereafter this option is used whenever the administrator would like to print the report immediately. Whenever the print Interval: field is changed from immediate to defferred or scheduled, the system responds as appropriate with the word deferred or scheduled. Furthermore, the screen changes to the format depicted in Figure 2-3 and the administrator is prompted to enter values for the print Time: and the days of the week fields.<br><br>**NOTE:**<br>The deferred option is only used when you want to schedule the report for a single printing. Thereafter, the Job Id is automatically removed from the Report Scheduler. Those reports that are administered as scheduled are printed on a week-after-week basis. |
| Print Time: | Within a given hour, reports maybe scheduled at 15-minute intervals (that is, xx:00, xx:15, xx:30, or xx:45).<br><br>The system printer requires significant switch processor resources. Therefore, it is important that the reports be scheduled for off-peak hours. Furthermore, the reports should not all be scheduled for the same hour and time interval, but should be staggered across multiple off-peak time intervals. If, because of printing volume or other problems, a report is not printed within 4 hours of its scheduled time interval, it will not be printed until its next scheduled time interval. This is a 4-hour (non-administrable) limit. Immediate and deferred jobs would be removed from the report scheduler under this scenario and would require reentry to print. |
| Days of Week: | For each day of the week that the report is to be printed, enter y (yes). Alternatively, enter n (no) for those days when the report should not be printed. Selecting an n for all seven days of the week will effectively disable a report from being printed. Days are defaulted to n. |

```
list report scheduler                                                    Page 1
                              REPORT SCHEDULER
    Job Id: 1                           Job Status: none
    Command: list report scheduler
    Print Interval: scheduled
    Print Time: xx:xx
         Sun: n   Mon: n   Tue: n   Wed: n   Thu: n   Fri: n   Sat: n
```

Figure 2-3. Report Scheduler Screen

Other commands, such as those described in Chapter 3, are added to the Report scheduler in a similar manner. Simply append the schedule qualifier to the command (for example, list aca-pararmeters schedule, etc.) and, whenever the first screen appears, change the `print Interval:` field from immediate to scheduled and subsequently administer the `print Time:` and the days of the week fields.

## Summary of the Steps for Printing Reports on the System-Printer

Procedure:

1. Execute a command with the schedule qualifier.

Response:

1. The first screen of the Report Scheduler (for example, Figure 2-2 with the appropriate command) is displayed. It indicates that the print interval is immediate.

Procedure:

2. Either (a) press the ENTER key—to print the report (immediately) on the system printer, or (b) since the cursor is on the word immediat e just type the word schedule or deferred and then press the ENTER key.

**NOTE:**

If you are using a personal computer (PC) running the 513 terminal emulation package, your keyboard will not have an ENTER key. You must map a function key to serve in this capacity. (Pressing the RETURN key will not achieve the desired results.) For instructions on key mapping refer to *DEFININITY® Communications System Generic 1 and Genetic3—System Management, 555-230-500.*

Response:

2. When the print interval is changed to scheduled or deferred, the `print Time:` and the days of the week fields are displayed (for example, Figure 2-3 with the appropriate command).

**Procedure:**

3. Type in the desired Print Time and press the *ENTER* key. The cursor is now on the days of the week field. For those days that you desire to print the report, type in a *!y!.*

**Response:**

3. Press the *ENTER* key to execute the oommand. The system responds with a prompt for the next command.

## Listing Scheduled Reports

**To display a list of all reports that are on the Report Scheduler, enter the** list report-scheduler **command. This command displays a list of all reports in the Report Scheduler. The order of the list is according to scheduled print time. Reports will be printed according to this list (for example, first report on the list is the first report printed). Figure 2-4 depicts the screen form for the** list report-scheduler **command. Table 2-3 describes the data fields for this screen.**

```
list report-scheduler                                              Page 1 of x
                              Report Scheduler

   Job Id     Days (smtwtfs)        Time       User       Status      Type
        Command
     4              nynnnnn        18:45      bcms       printing    immediate
       list measurements attendant-group time 14:15
     2              nynynyn        19:00      bcms       waiting     scheduled
       list measurements call-rate time 07:00
     7              nnnnnyn        19:15      bcms       waiting     deferred
       list bcms agent 5000 time  08:00      12:00
     23             nnynnnn        19:15      bcms       waiting     scheduled
       list bcms agent 4000  day  09/11      09/15
```

Figure 2-4. List Report Scheduler Screen

**NOTE:**
**In instances such as those for Job Id 4, if an immediate report is scheduled, the Days field is completed with one** Y **for the current day and** n **for all the others.**

**All fields are display-only. If, after reviewing this report, it is determined that changes need to be made, the** change report-scheduler **command maybe used to make the desired changes.**

Table 2-3. Report Scheduler Screen

| Field | Description |
|---|---|
| Job Id | Whenever a command is executed with the schedule qualifier, the system responds by generating a unique Job Id number. The Job Id assigned by the system is the lowest number from one to 50 not already used. |
| Days (smtwtfs) | On a per-day basis, an n indicates that the report will not be printed that day; a y indicates that the report will be printed that day. Selecting an n for all seven days of the week will effectively disable a report from being printed. |
| Time | The time interval that the report is scheduled to be printed. |
| User | The user login that scheduled the identified report. |
| Status | Same as Job Status which was described previously. The four possible states are:<br>■ Waiting—means that the report is not scheduled for any activity during the current 15-minute time interval.<br>■ Print-Next—means that the report is scheduled to be printed within the current 15-minute time interval.<br>■ Printing—means that the report is currently being printed.<br>■ Printed-means that the report has been successfully printed during the current 15-minute time interval. |
| Type | Indicates the type of print interval that is scheduled for the report. |
| Command | This field displays the complete command line (excluding the schedule option) that the user entered to produce the identified report. |

## Change Command

**The** change **report-scheduler command is used to change the schedule of a report. To display this screen form, enter the** change report-scheduler xx **command. The xx corresponds to the Job Id. Figure 2-5 depicts the Change Report Scheduler screen. Table 2-4 describes the data fields for this screen.**

```
change report-scheduler 23                                                  Page 1
                                        Report Scheduler
    Job Id: 23                                Job Status: printed
    Command: list bcms agent 4000 time start 08:00 stop 12:00
    Print Interval: scheduled
    Print Time: 19:15
     Sun: n    Mon: y    Tue: n    Wed: y    Thu: n    Fri: y    Sat: n
```

Figure 2-5. Change Report Scheduler Screen

Table 2-4. Change Report Scheduler Screen

| Field | Description |
|---|---|
| `Job Id:` | **This is a display-only field. It is the unique identifier for the report. The Job Id assigned by the system is the lowest number from 1 to 50, not already used.** |
| `Job Status:` | **This is a display-only field. It identifies the print status of the report. The four possible states are:**<br>■ **Waiting—means that the report is not scheduled for any activity during the current 15-minute time interval.**<br>■ **Print-Next—means that the report is scheduled to be printed within the current 15-minute time interval.**<br>■ **Printing—means that the report is currently being printed,**<br>■ **Printed—means that the report has been successfully printed during the current 15-minute interval.** |

***Continued on next page***

Table 2-4. Change Report Scheduler Screen (Continued)

| Field | Description |
|---|---|
| Job Status: | *Continued*<br><br>**NOTE:**<br>The print Time: and the days of the week fields maybe changed and effect a change of the Job Status. |
| Command: | This is a display-only field. It is the command that is to be executed. |
| Print Interval : | The three possible options are immediate, scheduled, and deferred.<br><br>If the print time of a report is changed so that its scheduled time now falls inside the current 15-minute time interval (that is, the Job Status field changes from waiting to print-next), the report will not be printed in the current interval. But, the report will be printed during the next scheduled time interval. As a contrast, if a report that is scheduled for some time interval (other than the current 15-minute time interval) has its print interval changed from scheduled to immediate, the report will be printed immediately. |
| Print Time: | Within a given hour reports may be scheduled at 15-minute intervals (that is xx:00, xx:15, xx:30, xx:45). This field maybe changed as desired.<br><br>The system printer requires significant switch processor resources. Therefore, it is important that the reports be scheduled for off-peak hours. Furthermore, the reports should not all be scheduled for the same hour and time interval, but should be staggered across multiple off-peak time intervals. If, because of printing volume or other problems, a report is not printed within four hours of its scheduled time interval, it will not be printed until its next scheduled time interval. This is a 4-hour (non-administrable) limit. |
| Days of Week | On a per-day basis, an n indicates that the report will not be printed for that day; a Y indicates that the report will be printed for that day. This field may be changed as desired. Selecting an n for all seven days of the week will effectively disable a report. |

2

## Remove Command

**The** remove report-scheduler **command is used to remove a report from the Report Scheduler. To display this screen, enter the** remove report-scheduler xx **command. The xx corresponds to the Job Id. Figure 2-6 depicts this screen. Table 2-5 describes the data fields for the screen.**

```
remove report-scheduler 23                                                    Page 1
                                         Report Scheduler
    Job Id: 23                                 Job Status: printed
    Command: list bcms agent 7000 time start 08:00 stop 12:00
    Print Interval: scheduled
    Print Time: 19:15
    Sun: n     Mon: y     Tue: n     Wed: y     Thu: n     Fri: y     Sat: n
```

Figure 2-6. Remove Report Scheduler Screen

**NOTE:**

**All fields are display-only. Once the user has verified that the identified report is the one to be removed, it is then necessary to press *RETURN.* Following this action, the system waits for the next command.**

Table 2-5. Remove Report Scheduler Command Screen

| Field | Description |
|---|---|
| Job Id: | The unique identifier for the report. The Job Id assigned by the system is the lowest number from one to 50 not already used. |
| Job Status: | Identifies the print status of the report. The four possible states are:<br>■ Waiting-means that the report is not scheduled for any activity during the current 15-minute time interval.<br>■ Print-Next—means that the report is scheduled to be printed within the current 15-minute time interval.<br>■ Printing—means that the report is currently being printed.<br>■ Printed—means that the report has been successfully printed during the current 15-minute interval.<br>**NOTE:**<br>If the Job Status is print-next, printed, or waiting (for example, not printing), it will be removed immediately. If the report is in the printing state, not only will the command be removed but the printer communication link will be changed to the link-down state. Furthermore, the printer communication link will be brought up again if other reports are in line to be printed for this time interval, or if an immediate job is scheduled or at the beginning of the next time interval, whichever comes first. |
| command : | The command associated with the Job Id that is being removed. |
| Print Internal: | The three possible options are immediate, scheduled, and deferred. |
| Print Time: | Within a given hour, reports maybe scheduled at 15-minute intervals (for example, xx:00, xx:15, xx:30, xx:45). |
| Days of Week | On a per-day basis, an n indicates that the report will not be printed for that day; a y indicates that the report will be printed that day. Selecting an n for all seven days of the week will effectively disable a report from being printed. |

# Traffic Data Analysis

# 3

3

## How This Chapter Is Organized

This chapter describes all of the traffic measurement reports, excluding processor occupancy and security reports. The reports are in alphabetical order. Each report description includes the following elements:

- An explanation of the report
- The full form for the command used to call up the report (elements of the command may be abbreviated as long as they are unique), including a description of any options
- An illustration of atypical report screen
- A table that defines all field labels in the report and, whenever appropriate, a "Suggested Actions" list is included.

The following reports are provided:

- Attendant Groups. Describes the traffic measurements and perfomance reports for attendant groups and attendant positions and provides the analysis of the data provided in the reports.
- Automatic Circuit Assurance. Describes the parameters and measurements reports for the ACA feature.
- Automatic Route Selection. Describes the measurements selection form and pattern measurements report for the ARS feature and provides the analysis of the data provided in the measurements report.
- Call Rate. Describes the Call Rate measurements and summary reports available with DEFINITY Generic 3 systems.
- Call Coverage Measurements. Describes the Principal Coverage and Coverage Path measurement reports available with DEFINITY Generic 3 systems.

- DS1 Link Performance Measurements. **Describes performance measurements for DS1 links. The reports available include detailed log and summary reports.**
- DS1 Converter. **Describes performance measurements for DS1 C links. The report available include detailed log and summary reports.**
- Hunt Groups. **Describes the traffic measurements, performance, and status reports for Automatic Call Distribution (ACD)/Uniform Call Distribution (UCD)/Direct Department Calling (DDC) Hunt Groups and provides the analysis of the data provided in the report.**
- Modem Pool Groups. **Describes the traffic measurements report for modem pool groups.**
- Performance Summary. **Describes the traffic measurements Performance Summary Report.**
- Port Network Load Balance. **Describes the the Blockage Study Report which provides information on loading and blocking for each port network as well as between switch node pairs; and the Load Balance Report which gives information on load and balance for each port network and indications of the source of the load.**
- System Status. **Describes the System Status Reports, which provide an overall view of how the system is performing.**
- Tone Receiver. **Describes the Tone Receiver Measurements Report which displays traffic data for tone receivers.**
- Traffic Summary. **Describes the traffic measurements Summary Report.**
- Trunk Groups. **Describes the traffic, outage, lightly used and measurements/selection reports, Call-By-Call (CBC), performance and status reports for Trunk Groups; and provides the validation and analysis of the data provided in the reports.**

# Some Notes Concerning the Report Screens

## Time and Date Fields

The time and date that the report was requested are displayed to the right, following the name of the report.

## Changing the Time

If you change the time, all the hours shown on the measurements reports appear as `hh**`.

## The Switch Name Field

The `switch Name:` field appears at the top left of all the traffic data analysis screens, just below the command. The field value is a 20-character string administered by the customer which uniquely defines the switch being measured.

## The Measurement Hour Field

The `Measurement Hour` is the starting time (using a 24-hour clock) of the hour during which the data was recorded.

# Attendant Reports

This section describes the traffic measurements and performance reports for attendant groups and describes the analysis of the data provided in the reports.

# Attendant Group Measurements Revert

The Attendant Group Measurements Report is used to assess the quality of service being provided to customers calling through the Listed Directory Numbers, and to facilitate the management of the attendant group so that it is neither under- nor over-staffed.

The Attendant Group Measurements Report consists of two sub-reports: The Attendant Group Sub-Report provides average hourly traffic measurements for the Attendant Group as a whole. The Attendant Positions Sub-Report gives peak individual Attendant Position Measurements.

Both sub-reports are available as PEAK reports for yesterday's peak hour, today's peak hour, and the last hour. A peak hour is the hour within a 24-hour period that had the greatest usage for the specified day.

Houly data for the entire attendant group can be obtained by polling the Attendant Group Report on an hourly basis.

# Attendant Group Sub-Report

Command

**To display the Attendant Group Report, enter:**

list measurements attendant group [print/schedule]

Options: **The print and schedule options are available for this command.**



Screens

**Figure 3-1 shows atypical screen for the Attendant' Group Sub-Report. Table 3-1 describes the data fields presented in the Attendant Group Sub-Report screen.**

```
list measurements attendant group                                         SPE A
Switch Name: Cust_Switch_Name                     Date: 4:47 pm WED NOV 27, 1991
                         ATTENDANT GROUP MEASUREMENTS
ATTENDANT GROUP
Grp  Meas  --------- Calls ---------  ----- Time ----  Time  Speed
Siz  Hour  Ans  Abnd Qued H-Abd Held  Avail Talk Held  Abnd  Ans (sec)
0    0     170   3    0    0     0      29   43    4     0     0     YEST PEAK
10   1200  1006  0    0    0     0     212   76    0     0     0     TODAY PEAK
10   1500  1007  0    0    0     0     224   64    0     0     1     LAST HOUR
```

Figure 3-1. Attendant Group Sub-Report

Table 3-1. Attendant Group Sub-Report

| Field | Description |
|---|---|
| Grp size | *Group Size.* The number of attendant positions (consoles) that are administered. This number may range from 1 through 28. |
| Meas Hour | *Measurment Hour* The hours represented are indicated by the labels in the right-hand column (the hours of yesterday's peak activity, today's peak activity, and the last hour activity). |
| Call- Ans. | Calls *Answered* The number of calls answered by all active attendants during the measurement hour. With Total Usage and Calls Answered, you can determine the Average Work Time (AWT), which is the time it takes an attendant to handle a call (refer to "Data Analysis" at the end of this chapter). |
| Call- Abamd | *Calls Abandoned.* The number of calls that ring an attendant group and drop (the caller hangs up) before an attendant answers. Where applicable, this total includes calls abandoned from the attendant queue before being answered. A call abandoned after being placed on hold is not included in this measurement, because it has already been added to the calls answered measurement.<br><br>Suggested Action: Observe times during which the calls abandoned number may be higher than desirable, and then schedule additional attendants in the group as needed during the indicated times. Also, see "Percent Occupancy," which is located under "Data Analysis Guidelines," later in this chapter. |

*Continued on next page*

Table 3-1. Attendant Group Sub-Report (Continued)

| Field | Description |
|---|---|
| `Calls Queued` | *Calls Queued.* **The total number of calls that were placed in the attendant queue (delayed) because no attendants were available. Calls remain in the queue:**<br>■ **Until an attendant becomes available and the call is connected.**<br>■ **Until the caller, while waiting in the queue, abandons the call (hangs up) before an attendant is available. See "Suggested Action" in the description of the `Calls Aband` field.**<br>■ **The call covers to another station in a coverage path.**<br><br>Suggested Action: **If there is a high percentage of** delayed **calls (Calls Queued); then the `Speed Ans` and `Calls Aband` fields may also be too high. Refer to "Suggested Actions" in the descriptions of the `call Aband` and `Speed Ans` fields.** |
| `Calls H-Abd` | **Calls Held-Abandoned. The number of calls that abandon while the caller is in hold mode.**<br><br>Suggested Action: **If this number is determined to be excessive, you should investigate and attempt to identify the reasons.** |
| `Calls Held` | ***Calls Held.* The number of calls that are answered by the attendant group, and subsequently placed on hold by the attendant group.** |

***Continued on next page***

Table 3-1. Attendant Group Sub-Report (Continued)

| Field | Description |
|---|---|
| `Time Avail` | *Time Available.* The time in hundred call seconds (CCS) during which the "pos avail" lamp is lit on all attended consoles, and the attendants are not talking on calls but are available to handle new calls.<br><br>**NOTE:**<br>An attendant can have calls on hold and still be available.<br><br>For example, if two attendants are available for 15 minutes each during the measurement hour, the total available time would be 30 minutes or 18 CCS (0.5 hour times 36 CCS per hour).<br><br>Consoles may be administered either (a) with their own unique extension number, or (b) without any extension number. For the "with extension number" case, traffic measurements for outgoing calls and incoming calls to the extension are allotted to the console's extension number and not to the attendant group. For the "without" case, all traffic measurements are allotted to the attendant group. In either case, time that the console is on outgoing calls will not be included in the attendant group's `time available` measurement.<br><br>Attendants are not available and do not accumulate time available when:<br>■ The position is in Night Service<br>■ The position was busied-out<br>■ The headset is unplugged<br>■ The attendant is servicing a call |

*Continued on next page*

Table 3-1. Attendant Group Sub-Report (Continued)

| Field | Decription |
|---|---|
| `Time Avail` | ***Continued***<br>Suggested Actions:<br>1. If the `Time Avail` plus `Time Talk` fields total to a number less than 36 CCS times the number of attendants, then some of the attendant positions were not staffed for the measurement hour. If this is a problem, then it is appropriate to staff additional positions during the busy hour(s).<br>2. If the `Time Avail` plus `Time Talk` fields equal 36 CCS times the number of attendants, then anytime available is idle time or time not spent on calls. A large number for the `Time Avail` field indicates a low occupancy. If this is a problem, then it is appropriate to reduce the number of attendant positions that are staffed. Staffed time is referred to as the sum of the two fields, `Time Avail` and `Time Talk`. |
| `Time Talk` | **Also referred to as *Talk Time.* It is the total time, during the measurement interval, that attendant(s) were active or talking on a loop. Numbers are displayed in units of CCS.**<br>**NOTE:**<br>**An attendant can have up to six calls on hold at any one time. However, each attendant can only be active on one loop at a time.**<br>Suggested Action: **If talk time is acceptable, but one or more of the other measurements are unacceptable, then all parameters should be studied in order to identify what should be changed (i.e., the number of consoles, number of attendant positions staffed, attendants schedule, faulty trunks, etc.).** |

*Continued on next page*

Table 3-1. Attendant Group Sub-Report (Continued)

| Fieid | Description |
|---|---|
| Time Held | Also referred to as *Held Time.* The total amount of time (measured in CCS) that the attendants have calls on hold. |
| Time Abnd | Also referred to as *Time to Abandoned.* The average amount of time (in seconds) that calls spend in queue plus ringing at the console before the callers hang up.<br><br>**NOTE:**<br>Time to abandoned does not include calls that overflow the attendant group queue.<br><br>$$\textit{Time To Abandoned} = \frac{\textit{Total Delay For All Abandoned Calls (in seconds)}}{\textit{Total Number of Calls Abandoned}}$$<br><br>Suggested Action: If the Time to Abandoned number is smaller than the Speed of Answer number then you will need more agents. As a contrast, if the Time to Abandoned number is larger than the Speed of Answer number, then the attendant group should process the calls faster.<br><br>The attendant group should be engineered so that "Time to Abandoned" approximately equals "Total Delay".<br><br>$$\textit{Total Delay} = (\textit{Time To Abandoned}) \times (\textit{\# of Abandoned Calls}) + (\textit{Speed of Answer}) \times (\textit{\# of Calls Answered})$$<br><br>$$\textit{Avg Delay} = \frac{\textit{Total Delay}}{\textit{Calls Answered} + \textit{Calls Aband}}$$ |

*Continued on next page*

Table 3-1. Attendant Group Sub-Report (Continued)

| Field | Description |
| --- | --- |
| Speed Ans (See) | **Speed *of Answer* in seconds. The average elapsed time from when a call terminates at the attendant group to when the call is answered by an attendant.**<br><br>**NOTE:**<br>**Calls terminate either (1) directly on an attendant console and subsequently begin ringing, or (2) in the attendant queue when there are no attendant positions available.**<br><br>$\text{Speed of Answer} = \dfrac{\text{Total Delay For All Answered Calls (in seconds)}}{\text{Total Number of Calls Answered}}$<br><br>Suggested Action: **If this number appears to be too high and all attendants are working at acceptable efficiency levels, consider additional training that may help the attendants complete calls more quickly. Alternatively, observe the hours during which speed of service becomes unacceptable and consider adding consoles and staffing additional attendants during those hours.** |

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## Attendant Positions Sub-Report

**The Attendant Positions Sub-Report provides hourly individual attendant position measurements. It is used to assess personnel performance, and to identify when additional training may be necessary.**

### Command

**To display the Attendant Positions Sub-Report, enter:**

list measurements attendant positions [print/schedule]

*Options:* **The print and schedule options are available for this command.**

**Figures 3-2 and 3-3 show a typical Attendant Positions Sub-Report. Table 3-2 describes the data presented in the Attendant Positions Sub-Report screen.**

```
list measurements attendant positions                          Page 1  SPE A
Switch Name: Customer_Switch_Name             Date: 4:46 pm WED NOV 27, 1991
                         ATTENDANT GROUP MEASUREMENTS
ATTENDANT POSITIONS
         Yesterday's Peak           Today's Peak            Last Hour
           Meas Hour: 0          Meas Hour: 1200       Meas Hour: 1500
Attd ------ Time ------ Calls ------ Time ------ Calls ------ Time ------ Calls
ID   Avail  Talk  Held  Ans.  Avail  Talk  Held  Ans.  Avail  Talk  Held  Ans.
1    0      0     0     0     0      0     0     0     0      0     0     0
2    0      0     0     0     0      0     0     0     0      0     0     0
6    0      0     0     0     27     9     0     127   28     8     0     126
7    0      0     0     0     26     10    0     125   28     8     0     126
8    0      0     0     0     26     10    0     125   28     8     0     126
9    0      0     0     0     26     10    0     125   28     8     0     126
10   0      0     0     0     27     9     0     126   28     8     0     126
15   0      0     0     0     26     10    0     126   28     8     0     125
            press CANCEL to quit -- press NEXT PAGE to continue
```

Figure 3-2. Typical Attendant Position Sub-Report

```
list measurements attendant positions                              SPE A
Switch Name: Customer_Switch_Name                       Date: 4:46 pm WED NOV 27, 1991
                                    ATTENDANT GROUP MEASUREMENTS
ATTENDANT POSITIONS
         Yesterday's Peak            Today's Peak             Last Hour
           Meas Hour: 0            Meas Hour: 1200        Meas Hour: 1500
Attd ------ Time ------ Calls ------ Time ------ Calls ------ Time ------ Calls
ID   Avail  Talk  Held  Ans.  Avail  Talk  Held  Ans.  Avail  Talk  Held  Ans.
20   0      0     0     0     27     9     0     126   28     8     0     126
25   0      0     0     0     27     9     0     126   28     8     0     126
```

Figure 3-3. Typical Attendant Positions Sub-Report

Table 3-2. Attendant Positions Sub-Report

| Field | Description |
|---|---|
| **Attd ID** | **A number between 1 and the maximum number of attendants to identify which attendant's data is being displayed This number is chosen by the user upon administering this attendant.** |
| **Time Talk** | **The time the attendant is active on calls. Time Talk is measured from the time the attendant activates an attendant loop until the loop is released. If more than one loop is active on an attendant console at one time, the usage is counted only once; i.e., one attendant is not counted as being busy more than once at a single time.** |
| **Time Held** | **The time the attendant had calls on hold.** |
| **Time Avail** | **The total time the subject attendant is available to receive calls during the polling interval.** |
| **Calls Ans** | **The calls answered by this attendant.** |

# Analyzing the Data

## Data Analysis Guidelines

The following guidelines are intended to show an easy method for determining whether currently reported data is acceptable or not. These guidelines represent the minimum that you should do to verify that the recorded measurement values are consistent with expected and historic values. You should perform additional checks as necessary.

To check the acceptability of hourly Attendant Group Measurements Reports, verify the following:

- The system clock or group size have not been changed during the measurement hour. If the system clock has been changed, the minutes field will display double asterisks (for example, 11**) and all other fields (for the indicated time interval) will display zero. The last hour log is not effected by a time change.
- The AWT typically ranges between 10 and 30 seconds per call (different values may be acceptable for specific applications).

**NOTE:**
Time Talk (in CCS) plus Time Avail (in CCS) should not exceed 36 times the group size. For example, with two attendant positions, this should not exceed 2 x 36 =72 CCS for data collection.

The attendant can have up to six calls on hold at onetime.

## Analyzing the Report Data

To use the Attendant Group Measurements Reports to estimate the number of attendant positions for the application, you will need additional data. The additional data needed can be calculated using data from the reports which you have subsequently recorded on the Worksheet 1. The following paragraphs describe how to use data from the completed Worksheet 1 to evaluate Average Work Time, Staffed Time, Attendant Offered Load, Percent Occupancy, and Percent of Calls Queued.

**NOTE:**
The Attendant Group Data Worksheet serves to backup the data from the reports and to provide an easy means for identifying the peak hour. The data from the identified peak hour should be used in subsequent calculations.

## Average Work Time

The Average Work Time (AWT) is the average number of seconds it takes attendants to process calls. The number of calls answered and the total time the attendants are busy handling these calls (Talk Time) are used to determine the AWT.

To determine AWT, use the figures for Talk Time, Time Held—(provided that time held is considered to be a part of the agents, normal work time), and Calls Answered from the measurements report in the following equation:

$$AWT = \left( \frac{\text{Talk Time} + \text{Time Held CCS}}{\text{Calls Answered}} \right) \times \left( \frac{100 \text{ Seconds}}{\text{CCS}} \right)$$

Example:

The typical report screen shown earlier in this section (see Figure 3-1) lists the following data for yesterday's peak hour:

- Time Talk =43 CCS or 4300 seconds
- Time Held = 4 CCS or 400 seconds
- Calls Answered = 170

Using these figures, the average work time is:

$$AWT = \left( \frac{43 \text{ CCS} + 4 \text{ CCS}}{170 \text{ calls}} \right) \times 100 \text{ Seconds} = 27.6 \text{ Seconds per call}$$

## Staffed Time

**Staffed time is the time that the attendant positions are manned (ready for calls). If staffed time (per agent) equals 36 CCS, then all agents were plugged in for the full hour. Using Figure 3-1 as an example, staffed time per agent is:**

$$\textit{Staffed Time (per Agent)} = \frac{\textit{Time Available} + \textit{Talk Time}}{\textit{\# of Agents}}$$

$$\textit{Staffed Time (per Agent)} = \frac{29\ CCS + 43\ CCS}{2} = 36\ CCS$$

## Attendant Offered Load

**The Attendant Offered Load (AOL) is the sum of the Calls Answered plus Calls Abandoned times the AWT. You can determine the AOL with the following equation:**

$$\textit{AOL (in seconds)} = (\textit{Calls Ans} + \textit{Calls Aband}) \times \textit{AWT in seconds}$$

$$\textit{AOL (in CCS)} = \frac{\textit{AOL in seconds}}{100}$$

**NOTE:**
**The equation assumes that if the abandoned calls had been answered, they would have taken the same time to service as calls that were answered.**

Example:

The typical report screen shown earlier in this section (see Figure 3-1) lists the following data for yesterday's peak hour:

- Calls Answered = 170
- Calls Abandoned = 3

And from the calls in the previous example:

- AWT = 27.6 secondS

Using this data, you can determine the AOL and the Percent Occupancy as follows:

$$AOL\ (in\ seconds) = (\ Calls\ Ans + Calls\ Aband\ ) \times AWT\ in\ seconds$$

$$AOL\ (in\ seconds) = (\ 170 + 3\ ) \times 27.6 = 4774.8\ seconds$$

$$AOL\ (in\ CCS) = \frac{4774.8\ seconds}{100} = 47.75\ CCS$$

## Percent Occupancy

The occupancy level may be expressed as a function of (a) the total time of the measurement hour, or (b) a function of the time the positions were plugged-in and attended. Generally, it is expected that all positions will be staffed 100 percent of the time during the peak busy hour. Therefore, the measurement Percent Occupancy (total time) is sufficient in most instances.

Assuming that attendant positions are staffed 100 percent of the time, then each position can handle 36 CCS of load during the peak hour. Therefore, based upon the calculated AOL of 47.75 CCS, two attendant positions are required.

The two status reports *monitor system view1* and *monitor system view2* may be used to display status of the attendant console positions. Specifically, you can use these two reports to determine, on an instantaneous basis, how many attendant positions are activated, and the identifying number of those that are deactivated.

**NOTE:**
Since the *monitor system view1* and view2 commands not only display status of the attendant consoles but also maintenance and traffic status, they are included in this chapter under the heading System Status.

For this example, the percent occupancy is calculated as follows:

$$\%\ Occupancy\ (total\ time)\ =\ \frac{AOL}{\#\ of\ staffed\ positions\ \times\ 36\ CCS} \times 100\ =$$

$$\frac{47.75\ CCS}{2\ \times\ 36\ CCS} \times 100\ =\ 61\%$$

Suggested Actions: **You should staff a sufficient number of positions so that the attendants are neither underworked nor overworked. If the percent occupancy is high and the time available (from the Worksheet) is low, the recommendation is to staff another attendant position. If the percent occupancy is low and the time available (from the worksheet) is high, the recommendation is to staff fewer attendant positions.**

**NOTE:**
**The Percent Occupancy should not exceed 92% (even on large systems with several attendant consoles). The 92% is a human factors limitation and does not apply to hardware sewers.**

**The formula for calculating "Percent occupancy (attended)" is as follows:**

$$Percent\ Occupancy\ (attended)\ =\ \frac{AOL}{Time\ Avail\ +\ Time\ Talk} \times 100$$

**Whenever all positions of the attendant group are staffed, the equation for percent occupancy (attended) will yield the same results as the equation for percent occupancy (total time).**

## Percent of Calls Queued

As the percent of calls queued increases, the Speed of Ans field will also indicate an increase. Callers are more likely to become frustrated as they are delayed and more likely to abandon their calls, thus contributing to the perception that the level of service has decreased.

Percent of Calls Queued (or delayed) is defined as follows:



$$\%\ Queued = \frac{Calls\ Queued}{Calls\ Ans + Calls\ Aband}$$

$$\%\ Queued = \frac{78\ calls}{170\ calls + 3\ calls} = \frac{78\ calls}{173\ calls} = 45\%$$

## Analyzing Customer Supplied (Theoretical) Data

For an installed system, the measurement reports are always recommended over theoretical data derived from traffic tables. However, it is recognized that there will be occasions when the use of traffic tables is necessary and desirable. For example, as a part of responding to a request for proposal (RFP), a potential customer may supply certain traffic data that is obtained independent of the switch, and request that the RFP include calculations indicating how well the switch will accommodate the specified traffic. It may also be desirable to use traffic tables during the system engineering and planning stage.

**NOTE:**
Traffic Engineering Capacity tables such as the Erlang-C Infinite Queue, Erlang-C Finite Queue, and Retrial Capacity are used for data analysis when necessary. Traffic Engineering Capacity tables are based on mathematical models in which certain assumptions are made about call arrivals, the serving process, and the disposition of blocked calls. *DEFINITY® Communications System and System 75 and System 85—Traffic Theory, 555-104-554,* contains a list of commonly used capacity tables.

## Speed of Answer

Given the appropriate variables, you can estimate the Speed of Answer. You need the following:

- Erlang-C lnfinite Queue Capacity tables (found in *DEFINITY® Communununi-cations System and System 75 and System 85 Traffic Tables, 555-104-*503)
- AWT
- Number of Attendant Positions Staffed (Working Servers)
- AOL, where: AOL = (Calls Ans + Calls Aband) x AWT

## Example:

Given the following data, estimate the Speed of Answer:

- Time Talk =43 CCS
- Time Held = 4 CCS
- Calls Answered = 170
- Using Time Talk, Time Held, and Calls Answered, the calculations indicate that AWT= 27.6 Seconds
- Number of Attendant Positions Staffed = 2
- Calls Abandoned = 3
- Using Calls Answered, Calls Abandoned, and AWT, the calculations indicate that AOL = 47.63 CCS

1. In the table shown in Figure 3-1, locate the row that corresponds to two attendant positions (working servers).
2. Read across to find the offered bad closest to 47.63 CCS. (The closest is 46.2 CCS, when rounding up.)
3. Read up to find the Average Delay in Multiples of Average Holding Time that corresponds to 46.2 CCS (for this example, the Average Delay in Multiples of Average Holding Time is .700).
4. Estimate the theoretical Speed of Answer by multiplying the Average Delay in Multiples of Average Holding Time by AWT (that is, Speed of Answer =.7 x 27.6 seconds = 19.3 seconds).

**NOTE:**

This example implies that all calls will have an average of 27.6 seconds delay. Some of the calls are answered immediately, while the remaining calls are delayed. To find the portion of calls that experience a delay before service can be estimated, use the table shown in Figure 3-4. The average delay of these calls can be estimated using the table shown in Figure 3-6.

AVE E (AVERAGE DELAY / AVERAGE HOLDING TIME)

| WRKNG SRVRS | .001 | .005 | .010 | 50 | .200 | .250 | .300 | .350 | .400 | .450 | .500 | .700 | 1.00 | 2.00 | WRKNG SRVRS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.0 | 0.2 | 0.4 | .7 | 6.0 | 7.2 | 0.3 | 9.3 | 10.3 | 11.2 | 12.0 | 14.8 | 18.0 | 24.0 | 1 |
| 2 | 2.3 | 5.1 | 7.2 | .0 | 29.4 | 32.2 | 34.6 | 36.7 | 38.5 | 40.1 | 41.6 | 46.2 | 50.9 | 58.8 | 2 |
| 3 | 9.7 | 16.8 | 21.4 | .2 | 58.0 | 61.9 | 65.1 | 67.8 | 70.1 | 72.2 | 74.1 | 79.7 | 85.3 | 94.2 | 3 |
| 4 | 21 | 33 | 40 | 83 | 89 | 93 | 97 | 180 | 103 | 106 | 108 | 114 | 120 | 130 | 4 |
| 5 | 36 | 52 | 61 | 14 | 120 | 126 | 130 | 134 | 137 | 139 | 142 | 149 | 155 | 165 | 5 |
| 47 | 1187 | 1298 | 1352 | 532 | 1540 | 1554 | 1569 | 1589 | 1602 | 1613 | 1621 | 1628 | 1633 | 1638 | 47 |
| 48 | 1218 | 1331 | 1385 | 567 | 1575 | 1589 | 1605 | 1624 | 1638 | 1649 | 1657 | 1663 | 1669 | 1673 | 48 |
| 49 | 1249 | 1363 | 1418 | 602 | 1610 | 1624 | 1641 | 1660 | 1674 | 1684 | 1693 | 1699 | 1705 | 1709 | 49 |
| 50 | 1280 | 1396 | 1452 | 637 | 1646 | 1660 | 1676 | 1696 | 1710 | 1720 | 1728 | 1735 | 1741 | 1745 | 50 |

AVERAGE DELAY IN MULTIPLES OF AHT THAT CORRESPONDS TO 46.2 CCS

ATTENDANT-OFFERED LOAD CLOSEST TO 43.77 CCS

Figure 3-4. Estimating the Speed of Answer

5. To determine the percentage of calls that experience a delay, use the Average Delay in Multiples of Average Holding Time that is closest to the expected AOL.

   a. In the Erlang-C Infinite Queue Capacity table shown in Figure 3-5, locate the row that corresponds to two working servers.

   b. Read across until you find the value closest to the expected AOL (the value closest to 47.83 CCS is 46.2 CCS).

   c. Read up to find the Average Delay in Multiples of Average Holding Time that corresponds to 46.2 CCS (the Average Delay in Multiples of AHT is .700).

   d. In the Erlang-C Probability of Delay table shown in Figure 3-5, find the .700 column.

   e. Read down this column until it intersects the row with two servers. The value at the intersection is .502, which represents the probability of delay. This value shows that 50.2 percent of the calls experience some delay before being answered.

| WRKNG | | | | AVE | E (AVERAGE DELAY / AVERAGE HOLDING TIME) | | | | | | | | | | | WRKNG |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SRVRS | .001 | .005 | .010 | .020 | .150 | .200 | .250 | .300 | .350 | .400 | .450 | .500 | .700 | 1.00 | 2.00 | SRVRS |
| 1 | .001 | .005 | .010 | .020 | .130 | .167 | .200 | .231 | .259 | .286 | .310 | .373 | .412 | .500 | .667 | 1 |
| 2 | .002 | .009 | .018 | .034 | .192 | .237 | .276 | .312 | .344 | .372 | .399 | .423 | .502 | .586 | .734 | 2 |
| 3 | .003 | .013 | .024 | .045 | .229 | .278 | .321 | .358 | .391 | .421 | .447 | .471 | .550 | .631 | .768 | 3 |
| 4 | .003 | .015 | .029 | .053 | .255 | .307 | .352 | .390 | .424 | .454 | .481 | .505 | .582 | .661 | .790 | 4 |
| 5 | .004 | .018 | .033 | .060 | .277 | .331 | .376 | .415 | .450 | .480 | .507 | .531 | .607 | .683 | .806 | 5 |
| 6 | .005 | .020 | .036 | .066 | .294 | .350 | .396 | .436 | .470 | .501 | .527 | .551 | .626 | .700 | .819 | 6 |
| 47 | .014 | .055 | .094 | .158 | .518 | .573 | .621 | .659 | .690 | .716 | .737 | .756 | .809 | .857 | .919 | 47 |
| 48 | .014 | .055 | .095 | .159 | .512 | .576 | .623 | .661 | .692 | .718 | .739 | .758 | .811 | .859 | .918 | 48 |
| 49 | .014 | .056 | .096 | .160 | .515 | .578 | .626 | .663 | .694 | .720 | .741 | .759 | .812 | .861 | .916 | 49 |
| 50 | .014 | .056 | .097 | .161 | .517 | .580 | .628 | .665 | .696 | .721 | .743 | .761 | .814 | .862 | .914 | 50 |

**AVERAGE DELAY IN MULTIPLES OF AHT (.700)**

**ESTIMATED PROBABILITY OF DELAY (.502)**

Figure 3-5. Estimating the Percentage of Delayed Calls

6. **To determine the Average Delay of the Delayed Calls, proceed as follows:**

   a. **In Figure 3-6, locate the .700 column.**

   b. **Read down this column until it intersects the row with two servers. (The value at the intersection is 1.40. This is the Average Delay of Delayed Calls in Multiples of Average Holding Time).**

   c. **To obtain the Average Delay of Delayed Calls in seconds, multiply the Average Holding Time by 1.40(1.40 x 27.6 seconds= 38.6 seconds).**

**In summary, when two attendant positions are provided to accommodate 173 calls during the busy hour, the speed of answer for all calls is 27.6 seconds. While 49.8 percent of the calls are answered immediately, the remaining 50.2 percent will have an average delay of 35.42 seconds.**

| WRKNG SRVRS | .001 | .005 | 1.01 | .020 | .150 | .200 | .250 | .300 | .350 | .400 | .450 | .500 | .700 | 1.00 | 2.00 | WRKNG SRVRS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.17 | 0.69 | 1.01 | 1.02 | 1.15 | 1.20 | 1.25 | 1.30 | 1.35 | 1.40 | 1.45 | 1.50 | 1.70 | 2.00 | 3.00 | 1 |
| 2 | 0.54 | 0.54 | 0.56 | 0.58 | 0.78 | 0.84 | 0.90 | 0.96 | 1.02 | 1.07 | 1.13 | [illegible] | 1.40 | 1.71 | 2.72 | 2 |
| 3 | 0.37 | 0.37 | 0.42 | 0.45 | 0.66 | 0.72 | 0.78 | 0.84 | 0.90 | 0.95 | 1.01 | 1.06 | 1.21 | 1.59 | 2.60 | 3 |
| 4 | 0.29 | 0.29 | 0.35 | 0.38 | 0.59 | 0.65 | 0.71 | 0.77 | 0.83 | 0.88 | 0.91 | 0.99 | 1.20 | 1.51 | 2.53 | 4 |
| 5 | 0.25 | 0.25 | 0.30 | 0.33 | 0.54 | 0.68 | 0.66 | 0.72 | 0.78 | 0.83 | [illegible] | 094 | 1.15 | 1.46 | 2.48 | 5 |
| 47 | 0.07 | 0.09 | 0.11 | 0.13 | 0.29 | 0.35 | 0.40 | 0.46 | 0.51 | 0.56 | 0.61 | 0.66 | 0.86 | 1.17 | 2.17 | 47 |
| 48 | 0.07 | [illegible] | 0.11 | [illegible] | 0.29 | 0.35 | 0.40 | 0.45 | 0.51 | [illegible] | 0.61 | 0.66 | 0.86 | 1.17 | 2.17 | 48 |
| 49 | 0.07 | 0.09 | 0.10 | [illegible] | 0.29 | 0.35 | 0.40 | 0.45 | 0.50 | 0.56 | 0.61 | 0.66 | 0.86 | 1.16 | 2.17 | 49 |
| 50 | 0.07 | 0.09 | 0.10 | [illegible] | 0.29 | 0.34 | 0.40 | 0.45 | 0.50 | 0.55 | 0.61 | 0.66 | 0.86 | 1.16 | 2.17 | 50 |

ATTENDANT POSITIONS REQUIRED

AVERAGE DELAY IN MULTIPLES OF AHT (.700)

AVERAGE DELAY OF DELAYED CALLS IN MULTIPLES OF AHT (1.40)

Figure 3-6. Estimating the Average Delay of Delayed Calls

## Estimating the Number of Attendant Positions Required

**Given the appropriate variables, you can estimate the number of attendant positions required to achieve a desired Speed of Answer. You need the following:**

- **Erlang-C CCS Capacity Tables**
- **AWT**
- **AOL**
- **Desired Speed of Answer**

Example:

**For this example, we will continue with the previous example's data; that is:**

- **AWT = 27.6 seconds**
- **AOL = 47.03 CCS**
- **Assume that the Desired Speed of Answer= 13 seconds.**

**To determine the Average Delay in Multiples of AWT:**

$$\textit{Average Delay in Multiples of AWT} = \frac{\textit{Desired Speed of Answer}}{\textit{AWT}} = \frac{13\ \textit{seconds}}{27.6\ \textit{seconds}} = .4710$$

a. In the table shown in Figure 3-7, Erlang-C Infinite Queue Capacity, locate the column that most closely corresponds to the objective delay of .4710 (this falls between .450 and .500, so use the .500 column).

b. Read down the column until the offered load closest to 47.63 CCS is found (this falls between 41.6 and 74.3, so use the 41.6 row).

c. Read horizontally to the left or right margin to find the number of servers required (number of servers required = 2).

| WRKNG | AVE | | E (AVERAGE DELAY / AVERAGE HOLDING TIME) | | | | | | | | | | | | | | | WRKNG |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SRVRS | .001 | .005 | .010 | 90 | .100 | .120 | .150 | .200 | .250 | .300 | .350 | .400 | .450 | .500 | .700 | 1.00 | 2.00 | SRVRS |
| 1 | 0.0 | 0.2 | 0.4 | .0 | 3.3 | 3.9 | 4.7 | 6.0 | 7.2 | 8.3 | 9.3 | 10.3 | 11.2 | 12.0 | 14.8 | 18.0 | 24.0 | 1 |
| 2 | 2.3 | 5.1 | 7.2 | 0.7 | 21.7 | 23.6 | 26.0 | 29.4 | 32.2 | 34.6 | 36.7 | 38.5 | 40.1 | 41.6 | 46.2 | 50.9 | 58.8 | 2 |
| 3 | 9.7 | 16.8 | 21.4 | 5.2 | 46.8 | 49.6 | 53.2 | 58.0 | 61.9 | 65.1 | 67.8 | 70.1 | 72.2 | 74.3 | 79.7 | 85.3 | 94.2 | 3 |
| 4 | 21 | 33 | 40 | 73 | 75 | 78 | 83 | 89 | 93 | 97 | 100 | 103 | 106 | 108 | 114 | 120 | 130 | 4 |
| 5 | 36 | 52 | 61 | 02 | 104 | 108 | 114 | 120 | 126 | 130 | 134 | 137 | 139 | 142 | 149 | 155 | 165 | 5 |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 47 | 1187 | 1298 | 1352 | 532 | 1540 | 1554 | 1569 | 1589 | 1602 | 1613 | 1621 | 1628 | 1633 | 1638 | 1650 | 1661 | 1675 | 47 |
| 48 | 1218 | 1331 | 1385 | 567 | 1575 | 1589 | 1605 | 1624 | 1638 | 1649 | 1657 | 1663 | 1669 | 1673 | 1686 | 1697 | 1710 | 48 |
| 49 | 1249 | 1363 | 1418 | 602 | 1610 | 1624 | 1641 | 1660 | 1674 | 1684 | 1693 | 1699 | 1705 | 1709 | 1722 | 1733 | 1746 | 49 |
| 50 | 1280 | 1396 | 1452 | 637 | 1646 | 1660 | 1676 | 1696 | 1710 | 1720 | 1728 | 1735 | 1741 | 1745 | 1758 | 1770 | 1781 | 50 |

COLUMN CLOSELY CORRESPONDS TO OBJECTIVE DELAY OF .4743

ATTENDANT-OFFERED LOAD CLOSEST TO 43.77 CCS

Figure 3-7. Estimating Attendant Position Requirements

## Estimating Percent Occupancy

**To determine the percent occupancy (total time) you will need the following data:**

- **Number of attendant positions staffed**
- **AOL**

Example:

**For this example we will continue with the previous example's data; that is:**

- **AOL = 47.63 CCS**
- **#of positions staffed = 2**

**Assume that the attendant positions are staffed 100 percent of the time, then each position can handle 36 CCS of bad during the peak hour.**

$$\%\ Occupancy\ (total\ time) = \frac{AOL}{\#\ of\ staffed\ positions\ \times\ 36\ CCS} \times 100 = \frac{47.83\ CCS}{2\ \times\ 36\ CCS} \times 100 = 66\%$$

# Automatic Circuit Assurance

This section describes the parameters and measurements reports for the Automatic Circuit Assurance (ACA) feature. Specifically, these two reports are identified as the (1) ACA Parameters Report, and (2) ACA Measurements Report.



The ACA feature may be used to identify possible malfuctioning trunks by providing an alerting mechanism that monitors:

- The occurrence of an excessive number of short holding time calls
- The occurrence of calls that have an abnormally long holding time

When the number of short holding time calls exceeds the established threshold, or the duration of a call exceeds the established long holding time limit, the following actions occur:

1. An entry is made on the ACA Measurement Report.
2. A referral call is placed to a designated attendant console or display-equipped voice terminal.

**NOTE:**
Refer to the *DEFINITY® Communications System Generic 1 and Generic 3—Feature Description, 555-203-201,* for a more complete description of the ACA feature.

Background Information:

1. To determine if the ACA feature is enabled, execute the `display system-parameters feature` command.
2. When ACA is enabled, it maybe used either on a single system basis or in a Distributed Communications System (DCS) network. Administration of the ACA Referral Calls field (also displayed on the System Parameters screen) determines where referral calls are reported. For DCS networks, one switch (the primary) is administered to report the ACA measurements for all switches within the network Furthermore, the field ACA Remote PBX Identification must be administered with the PBX ID of the node that is designated as primary.

   For non-DCS arrangements, the switch is administered as local.
3. The switch that displays the ACA measurements must have a valid number administered in the ACA Referral DestInation field.
4. A valid ACA referral destination can be any of the following:
   - An individual attendant
   - The attendant group
   - A designated station that is equipped with an alphanumeric display.

5. The console or voice terminal that is administered as the Referral Destination will also have a display button (ACA referral call) administered. This button is used to activate a once-through scroll of the referral calls. Calls are answered/displayed beginning with the oldest and ending with the most recent. After the calls have been answered once, the referral call history can only be displayed with the ACA Measurements Report.

   **NOTE:**
   The ACA display button turns the ACA Referral Call feature on and off. When the ACA button is enabled, referral calls, on a system-wide basis, are completed.

6. Those systems equipped with a Speech Synthesizer circuit pack may also provide an audio (voice synthesized) report of the referral calls.

# ACA Parameters Report

**The ACA Parameters Report lists all trunk groups in the system and displays the current definitions (parameters) for long and short holding times.**

**NOTE:**
**The parameters are administered on the trunk group forms.**



Command

**To display the ACA Parameters Report, enter:**

list aca-parameters [number][to number][name] **[aca-on y or n]** [count-no] [print] or [schedule]

Options: **The group number, group name, "aca on", count, print, and schedule options are available for this command.**

Screen

**Figure 3-8 shows a typical screen for the ACA Parameters Report. Table 3-3 describes the data fields presented in the ACA Parameters Report screen.**

```
list aca-parameters
Switch  Name:  Cust_Switch_Name
                                   ACA PARAMETERS
 Group         Group     Group           ACA     Short      Short        Long
 Number  TAC   Type      Name            On?   Hold Time  Threshold   Hold Time
   41    351   tie       MARKETING        n       10         15           1
   42    352   tie       PURCHASING       n       10         15           1
   43    353   isdn-pri  D5-G2 PRI Tie    n       10         15           1
   44    354   tie       FINANCE          n       10         15           1
   45    355   tie       SALES            n       10         15           1
   46    356   tie       NEW YORK         n       10         15           1
   54    373   wats      SERVICE-WATS     y       10         15           1
   55    371   tie       DATA LINK        n       10         15           1
   57    387   tie       2 WAY TIE LINE   y       10         15           1
   58    386   wats      NJ-WATS          y       10         15           1
   59    385   wats      WATS-800         y       10         15           1
   60    384   did       DID              y       10         15           1
   61    383   co        WASHINGTON       y       10         15           1
Command successfully completed
enter command:
```

Figure 3-8. Typical ACA Parameters Report

Table 3-3. ACA Parameters Report

| Field | Description |
|---|---|
| Group Number | A unique number (assigned during administration) that identifies each trunk group. It maybe any number within the range of one to the maximum number of trunk groups supported by the system. The range of possible numbers is one through 666 (one through 50 whenever the Hospitality Parameter Reduction feature is used). |
| TAC | The Trunk Access Code (assigned during administration) for the trunk group. |
| Group Type | The type of trunk associated with the accumulated data. The system monitors the following trunk types:<br>■ Acess (ace)<br>■ Advanced Private Line Termination (apt 1)<br>■ Central Office (co) or Public Network Service<br>■ Customer Provided Equipment (cpe)<br>■ Digital Multiplexed Interface-Bit Oriented Signaling (dm1-bos)<br>■ Direct Inward Dialing (did)<br>■ Foreign Exchange (fx)<br>■ Integrated Services Digital Network (isdn-pri)<br>■ Release Link Trunk (r1t)<br>■ Tandem (tan)<br>■ Tie Trunk (tie)<br>■ Wide Area Telecommunications Service (wats)<br>**NOTE:** Refer to the *DEFINITY® Communications System Generic 3r—Implementation, 555-230-551* for a complete definition of these trunk group types. |
| Group Name | The trunk group identification that is administered on the Trunk Group form. |

*Continued on next page*

Table 3-3. ACA Parameters Report (Continued)

| Field | Description |
|---|---|
| ACA On? | Indicates whether or not the trunk group is being monitored by ACA.<br><br>Suggested Actions: The decision to monitor a trunk group (field entry Y) may depend on a complaint from a user, historical problems, or suspicious data from another report. ACA measurements may be used in conjunction with other measurement reports for confirmation purposes. These other reports include:<br><br>■ The list performance trunk-group<br>■ The list performance summary<br>■ The list measurements outage-trunk<br>■ The list measurements trunk-group.<br><br>When you no longer have a specific reason to monitor a trunk group with ACA measurements, the field should be n. |
| Short Hold Time | The maximum number of seconds that a call will be considered a short holding time call. A holding time that is longer than this value will be considered as a normal call up until the long holding time is exceeded. The short holding time value is specified on the Trunk Group form when the trunk group is administered. The field range is from zero to 160 seconds with 10 seconds being the default. |
| Short Threshold | The system maintains a running count of each call that has a duration of less than or equal to the administered short holding time. The count is increased by one for each call that meets the short holding time criteria and decreased by one for each call that does not. When this count reaches the designated threshold, an entry is made in the ACA Measurements Report, and a referral call is placed. The threshold value is specified on the Trunk Group form when the trunk group is administered. The field range is from zero to 30 with 15 being the default. |
| Long Hold Time | The minimum time of seizure, in hours, that the system will consider a call as having a long holding time. This number is specified on the Trunk Group form when the trunk group is administered. The number has a range of zero to 10 hours with one hour as the default.<br><br>A referral call is placed as soon as a single long holding call is detected. Subsequently, a referral call is placed at the top of the hour until the problem is resolved or until the trunk becomes idle. |

# ACA Measurements Report

**The ACA Measurements Report displays the audit trail list of short and long holding time calls that have been referred for having exceeded the established limits.**

## Command

**To display the ACA Measurements Report, enter:**

list measurements aca [print] or [schedule]

Options: **The print and schedule options are available for this command.**

## Sceen

**Figures 3-9 and 3-10 show a typical screen for the ACA Measurements Report. The date and time that the report was requested is displayed to the right, following the name of the report.**

**This report may contain up to 64 entries on several pages. If more than 64 referrals have been entered since the last system reinitialization, the report will show the 64 most recent entries; older entries, if any, will have been overwritten. As shown in Figure 3-9, if more than 14 referrals have occurred since the last system re-initialization, press `NEXT PAGE` to see additional entries, or press `CANCEL` to exit the report.**

**Table 3-4 describes the data fields presented in the ACA Measurements Report screen.**

```
list measurements aca                                                    Page  1
Switch Name: Cust_Switch_Name                      Today: 2:11 pm TUE May 1, 1990
Automatic Circuit Assurance Measurements
Day & Time          Trunk           Trunk          Trunk       Type of
of Referral       Group No.      Access Code       Member      Referral
 29/10:00            57              387             6           Long
 28/14:00            62              382             4           Short
 27/20:00            59              385             1           Long
 27/19:00            59              385             1           Long
 24/15:58            59              385             2           Long
 24/10:00            63              381             1           Long
 24/09:00            63              381             1           Long
 23/11:00            61              383             9           Short
 23/09:00            61              383             9           Long
 22/13:18            63              381             5           Long
 22/11:42            62              382            12           Long
 22/06:44            57              387            11           Short
 21/13:00            62              382             5           Long
 20/21:22            61              383             1           Long
                 press CANCEL to quit --  press NEXT PAGE to continue
```

Figure 3-9. ACA Measurements Report Screen

```
list measurements aca                                                    Page  2
Switch Name:  Cust_Switch_Name                     Today: 2:11 pm TUE May 1, 1990
Automatic Circuit Assurance Measurements
Day & Time          Trunk           Trunk          Trunk       Type of
of Referral       Group No.      Access Code       Member      Referral
 20/15:52            63              381             3           Long
 20/13:00            60              384             8           Long
 17/16:26            63              381             2           Long
 17/13:38            63              381             3           Short
 16/22:17            60              384             7           Long
 16/12:26            57              387             5           Short
 16/12:26            54              373             2           Long
 16/11:46            60              384             7           Long
Command successfully completed
enter command:
```

Figure 3-10. ACA Measurements Report Screen

Table 3-4. ACA Measurements Report

| Field | Description |
|---|---|
| Day & Time of Referral | The day and time at which either the threshold for short holding time calls was exceeded or long holding time tail was reached and a referral call was entered (see Table 3-3 for definitions of short and long holding times and short threshold time). Expressed as:<br><br>day of the current month/hour:minute<br><br>**NOTE:**<br>The report lists referral tails beginning with the most recent and continuing back in time until either all referrals are listed or the most recent 64 are listed.<br><br>Referral calls are only attempted if the referral button is enabled. A referral call is completed if the call is answered. A call that is not answered will be attempted again when a new ACA call is received. |
| Trunk Group No. | Number of the trunk group in which the referral occurred.<br><br>**NOTE:**<br>For DCS networks, the PBX ID of the remote node is prepended to the trunk group number. |
| Trunk Access Code | Trunk Access Code for the trunk group. |
| Trunk Member | One specific trunk in the group that incurred the referral.<br><br>**NOTE:**<br>This information can be used, with other maintenance tests, to identify the equipment location (circuit pack) of the trunk group member. |
| Type of Referral | Indicates whether the referral occurred as the result of too many short holding time tails or an excessively *long* holding time call.<br><br>Suggested Action: Generally, the occurrence of a referral call should serve as a warning that potential trunk failures are possible and actual trunk failures may be occurring. Resolution of the problem should, in most cases, be the function of maintenance personnel. Depending upon local arrangements, it maybe appropriate to alert maintenance personnel if they have not already been alerted. |

# Automatic Route Selection

Automatic Route Selection (ARS) is an optional feature. When used, it functions to route calls over the public network The route selected is based on the preferred (usually least expensive) route available at the time the call is placed.

There are two measurement screens related to the ARS feature. The Measurement Selection form displays the list of patterns that are to be measured. The Pattern Measurements Report displays traffic data for the specified pattern (as a whole) as well as the distribution of traffic on the trunk groups in the pattern.

# ARS Measurements Selection Form

**You can select up to 25 ARS patterns for measurement from the 640 patterns** available.

## Commands

**To display the Iii of ARS patterns that are to be measured, enter:**

display meas-selection ars print] or [schedule]

**To change the list of ARS patterns that are to be measured, enter:**

change meas-selection ars

Options: **The print and schedule options are available for the “display’ command (see Note).**

**NOTE:**
**Routing pattern numbers are administered as a part of the system implementation process; more specifically, as a part of administering the ARS feature. This procedure is fully described your *Implementation* manual.**

## Screen

**Figure 3-11 shows a typical ARS Measurements Selection form containing entries for the 25 patterns to be measured. Table 3-5 describes the data fields presented in the ARS Measurements Selection Form.**

```
change meas-selection
                              ARS MEASUREMENT SELECTION
Pattern No.    Pattern No.    Pattern No.    Pattern No.    Pattern No.
 1: ____        6: ____       11: ____       16: ____       21: ____
 2: ____        7: ____       12: ____       17: ____       22: ____
 3: ____        8: ____       13: ____       18: ____       23: ____
 4: ____        9: ____       14: ____       19: ____       24: ____
 5: ____       10: ____       15: ____       20: ____       25: ____
```

Figure 3-11. ARS Measurements Selection Screen

If the pattern number(s) you desire are not listed, you can add the desired numbers by replacing existing pattern numbers that are no longer needed: Press *RETURN* until the cursor is placed on an undesired pattern number; enter the desired new number, or, press CLEAR FIELD and enter the desired new number. Pattern numbers do not have to be in numerical order. The actual changes are made when you press *ENTER.* As always, a command can be abated by pressing CANCEL.



Table 3-5. ARS Measurements Selection Form

| Field | Description |
|---|---|
| Pattern No. | *Pattern number.* Lists the numbers of the 25 patterns selected for measurement. The defaults are pattern 1 through pattern 25. |

# ARS Pattern Measurements Report

**The ARS Pattern Measurements Report contains usage measurements for each of the 25 selected ARS patterns. Each routing pattern can contain from 1 to 16 trunk groups (mutes). This report displays traffic data for the specified pattern (all trunk groups within the pattern, as a whole) as well as the distribution of traffic on each trunk group in the pattern.**

## Command

**To display the ARS Pattern Measurements Report, enter:**

list measurements route-pattern pat_no yesterday/today/last hour [print] or [Schedule]

Options: **The print and schedule options are available for this command.**

**Type the number of the pattern (1 to 640) you wish to display. This number must previously have been assigned to one of the 25 numbers on the ars meas-selection form. And, in order to obtain data for the pattern, it must previously have been administered on the ARS forms.**

**You must also enter "today" for today's total activity, "yesterday" for yesterday's total activity, or "last hour" for the activity of the most recently completed hour.**

**For example, to display yesterday's measurements for ARS pattern 27, enter:**

**list** measurements mute-pattern **27 yesterday**

Screen

**Figure 3-12 shows a typical screen for the ARS Pattern Measurements Report. Table 3-6 describes the data fields presented in the report.**

```
list measurements route-pattern 1 last-hour
Switch Name: Customer_Switch_Name              Date:  1:54 pm MON SEP 16, 1991
                  ARS PATTERN MEASUREMENTS
Pat.   Queue   Calls     Calls     Calls     Calls    Queue
No.    Size    Offered   Carried   Blocked   Queued   Ovflo.
1      0       7         7         0         0        0
                        TRUNK GROUP MEASUREMENTS FOR PATTERN
                  (trunk groups are shown in order of selection)
Grp  Grp      Grp     Grp     ------ % Calls Carried -------      %     Total
No.  Type     Size    Dir     10 20 30 40 50 60 70 80 90 100   Calls   Calls
37    tand    22      two     ///////////////////////////////   100    7
```

Figure 3-12 ARS Pattern Measurements Report Screen

Table 3-6. ARS Pattern Measurements Report

| Field | Description |
|---|---|
| Pat. No. | *Pattern number. The* ARS pattern number (from 1 through 640) being measured. |
| Queue Size | The size (length) of the queue for the first trunk group in the ARS pattern. This is commonly referred to as the ARS pattern queue size. A queue is an ordered sequence of calls waiting to be processed. For this example, a maximum of five calls may be in queue at any onetime. |
| Calls Offered | The total number of calls offered to the ARS pattern.<br><br>calls offeed(With Queue) = *# of Call Carried +*<br>*#of Queue Overflow Calls +*<br>*#of Queue Abandon Calls*<br><br>*Calls Offered (Without Queue) = #of Calls Carried +*<br>*# of calls Blocked* |
| Cal1s Carried | *The* total number of seizures (for all trunk groups) in the ARS pattern. |

*Continued on next page*

Table 3-6. ARS Pattern Measurements Report (Continued)

| Field | Description |
|---|---|
| Calls Blocked | The number of offered outgoing calls that found all trunk groups in the pattern busy. If the queue overflows, then the call is still blocked.<br>Specifically, a blocked call is a call that:<br>1. Arrives when there are no available resources<br>2. Arrives and gets queued<br>3. Arrives when the queue is full<br>4. Arrives and cannot queue because the queue length is set to zero<br>5. Cannot queue because the Automatic Callback (ACB) button is busy<br>6. Cannot queue because there is no ACB button. |
| Cal1s Queued | The number of offered calls that found all trunk groups in the pattern busy and were placed in queue for the first trunk group (first-choice trunk group) in the pattern. |
| Queue Ovflo. | *Queue Overflow.* The number of calls that find the queue on the first trunk group full. Calls attempted while the queue is in overflow receive a busy signal. Queue overflow calls are blocked calls. |
| Grp No. | *Group Number. The* number, assigned via the Trunk Group form, that identifies each trunk group associated with the displayed data. Trunk groups are listed in the same order as they are assigned on the Routing Pattern form. The first trunk group listed is the first selected (preference 1); the second listed is the second selected (preference 2), etc. A maximum of sixteen different preferences maybe displayed on this report. The range of possible trunk group numbers for G3r is 666. |

*Continued on next page*

Table 3-6. ARS Pattern Measurements Report (Continued)

| Field | Description |
|---|---|
| Grp Typo | *Group Tue. The type of* trunk in the group. The following types of trunk groups can be accessed by ARS:<br>■ Local central office co<br>■ Foreign Exchange fx<br>■ Integrated Services Digital Network-Primary Rate Interface (isdn-pri)<br>■ Tie Trunk tie<br>■ Wide-Area Telecommunications Service wats |
| Grp size | *Group Size.* The number of trunks in the group. The range of possible numbers is 1 through 256. |
| Grp Dir | *Group Direction.* Identifies whether the assigned trunk groups are outgoing only (out) or 2-way (two).<br>**NOTE:**<br>Incoming trunks cannot be ARS trunks. |
| % Calls Carried | A graphic display showing the percent of total calls carried on the pattern for each trunk group. |
| % Cal1s | The percent of the total calls carried on the pattern for each trunk group.<br>Suggested Action: The first trunk group listed in the report is the first choice trunk group. This trunk group should always carry a significantly larger percentage of the calls than any of the other trunk groups. If not, you should add more members so that the first choice trunk group has significantly more members than any other group in the pattern. |
| Total Calls | The total number of calls carried on the pattern for each trunk group. For the today report, this field indicates the number of calls carried since the previous midnight. For the yesterday report, this field indicates the number of calls carried all day (24 hours) yesterday.<br>**NOTE:**<br>This column displays a cumulative number there are no peak data measurements for the ARS reports. However, you can use the trunk group reports to display "peak" as well as other data. |

# Data Analysis Guidelines

The following guidelines are intended to show an easy and fast method of determining whether the collected data is invalid or questionable. These guidelines represent the least that you should do for validation. You should perform additional validation as necessary.

To validate the ARS Measurements Report, verify that the following data is in Order:

- Total Calls Offered to a pattern should always be equal to the sum of the columns "Calls Carried" plus "Queue Overflow" plus "Queue Abandoned" if there is a queue on the first preference.
- Total percent of all calls carried in a pattern (sum of the % Calls column for each trunk group) should never exceed 100.

## Analyzing the Data

The ARS Pattern Data worksheet serves to back up the data from the reports and to provide an easy means to view overall performance of the specified route-pattern. The ARS reports/worksheet do not identify a peak hour but do total the data for the identified time period.

The ARS Pattern Measurements Report summarizes data for the specified ARS pattern. This report is intended to assist you in determining the following:

- How traffic is distributed over the trunk groups in the pattern
- Whether the Facility Restriction Levels (FRLs) are administered properly
- The proper number of trunk members and trunk groups.

Routing Patterns are administered as a part of ARS administration. If, after analyzing the data presented with this report, you determine that the Routing Pattern should be changed (for example, you need to increase the number of trunk members or trunk groups), then you must go back to the ARS Routing Pattern form to make the changes. For example, if the FRL for the Routing Pattern is to be changed, you must go back to the ARS Routing Pattern form to make this change. A more likely scenario would be that the users, attempting to originate calls over the ARS pattern, will be blocked because the number assigned to their FRL is lower than that assigned to the trunk group. A user can only access trunk groups with numbers the same or lower than their FRL number, (They cannot access trunk groups with numbers higher than their FRL's).

A pattern may have enough trunks but may not have proper FRLs assigned to the users that attempt to originate calls with the pattern. If the report indicates a high number for the Calls Queued column and/or Queue Overflow column, but the usage on trunks in the groups following the first choice trunk group is low, consider identifying the group of users who are attempting to originate calls but are being blocked and raise this group's FRL. This can be accomplished by accessing the Class of Restriction form and increasing the FRL number for the identified group or groups of users.

If the report indicates a high Queue Overflow rate and a high usage rate for all trunk groups in the pattern, then this probably indicates that there are not enough trunks. For this scenario a variety of solutions maybe implemented. Generally, the simplest is to increase the number of first choice trunks. Another consideration is to add more trunk groups to the pattern. Perhaps the most drastic change is to reorganize the ARS Routing Patterns.

Generally, you will want to minimize the number in the Calls Blocked column. Although there may be certain users' calls that you do want to block.

Additional and somewhat related information is available on the Performance Summary report. For example, the Perfomance Summary report lists the five trunk groups that have the highest percent of blocking during their peak hour. Furthermore, the report lists the trunk group members that are out of service. Also listed are the trunk members, by trunk group, that were not used during the reporting period.

The Trunk Groups report provides measurement data that relates to the ARS Pattern Measurements report. For example, the total number of calls overflow from the first choice trunk group is listed in the "Grp Ovfl" field. It should be understood that these are the calls that repetitively overflow to the other (second, third, etc.) trunk groups.

# Call Rate Measurements Report

This section describes the Call Rate Measurements Report available with DEFINITY G3 systems.

The Call Rate Measurements Report provides traffic data for all calls (both incoming and outgoing) that are completed on the system during the following time intervals:

- Last hour
- Current day's peak hour
- Previous day's peak hour

The peak hours are the hours with the greatest number of calls and the hours with the busiest 36-second intervals. A 36-second interval (1 CCS, or 1 one-hundredth of an hour) is used so the number of busy intervals times 100 will give the peak call rate for the listed hour. For example, assume that you have normal traffic (not bursty) and that there were 31 calls for the peak 36-second interval of the last hour, then the peak calling rate would have been 3100 CCS. Obviously, the number of calls actually completed would normally be much less than this number.

All originated calls except those directed to an announcement or those generated by maintenance are counted. For example, a facility access test call will not be counted as a completed call.

## Command

To display the Call Rate Measurements Report, enter

list measurements call-rate [print] or [schedule]

Options: **The print and schedule options are available for this command.**

## Screen

Figure 3-13 shows the Call Rate Measurements Report format. Table 3-7 lists and describes the data in the Call Rate Measurements Report.

```
list measurements call-rate                                              Page 1
Switch Name: Cust_Switch_Name                   Date: 2:24 pm WED SEP 25, 1991
                          CALL RATE MEASUREMENTS
                                     Last Hour
                   -------------------------------------------------------------
                   Hour   # Compl   Busy Int. (36 sec.)  # Busy Int. Calls Compl
                   1300    0             13:58:48                  0
                                    Today Peak
                   -------------------------------------------------------------
                   Hour   # Compl   Busy Int. (36 sec.)  # Busy Int. Calls Compl
Busiest Hour:      900     20481         09:51:00                  224
Busiest Interval:  900     20481         09:51:00                  224
                                   Yesterday Peak
                   -------------------------------------------------------------
                   Hour   # Compl   Busy Int. (36 sec.)  # Busy Int. Calls Compl
Busiest Hour:      0       0             00:00:00                  0
Busiest Interval:  0       0             00:00:00                  0
```

Figure 3-13. Call Rate Measurements Report Screen

The primary purpose of this report is to identify system-level peak calling activity and the hour that the activity occurred. Typically, the busiest hour for peak calling activity (for example, 1300 hours in this example) will be the same as the peak hour for all trunk groups, which is identified on the Trunk Group Measurements report. However, conditions could be such that the two reports indicate different hours.

**NOTE:**
The call summary report, which is described next, lists the number of completed calls for the last 24 hours. Therefore, if you compare the Call Rate Report with the Call Summary Report you should see some of the same information. Additional data on various types of calls may be found in the Occupancy Summary Report.

Table 3-7. Call Rate Measurements Report

| Field | Description |
|---|---|
| Hour | *Measurement Hour.* The starting time (using 24-hour clock) of the hour during which the data was recorded. |
| # Campl | *Number of Calls Completed.* The total number of calls completed, or answered (including both incoming and outgoing), during the listed hour. |
| Busy Int . (36 Sec.) | *Busy Interval* (36 seconds). The 36-second interval within the listed hour that had the most call completed. |
| # BUSY Int. Calls Campl | *Number of Busy Interval Calls Completed. The* total number of calls completed in the listed busy interval. |
| Busiest Hour: | For peak listings, this row identifies the busiest hour for today's and yesterday's peak hour. This is the hour that had the largest number of completed calls. |
| Busiest Interval : | For peak listings, this row identifies the hour that contained the busiest 36-second interval for today and yesterday. The hour containing the busiest 36-second interval is not necessarily the same hour as the one reported as the busiest complete hour of the 24-hour period. |

# Call Summary Measurements Report

The Call Summary Measurements Report provides an hourly summary of the traffic data for the last 24 hours. All call completions, except those generated by maintenance, are counted. For example, a Facility Test Call will not be counted as a call completion.

## Command

To display the Call Summary Measurements Report, enter:

list measurements call-summary [print or schedule]

Option: The print and schedule options are available for this report.

**NOTE:**
Calls are counted on initial completion and not as conference and transfer calls.

## Screen

Figure 3-14 shows the Call Summary Measurements Report format. Table 3-8 lists and describes the data fields in the Call Summary Measurements Report.

```
list measurements call-summary
Switch Name: Cust_Switch_Name                    Date: 4:20 pm TUE MAY 8, 1990
                          CALL SUMMARY MEASUREMENTS
                          Summary of Last 24 Hours
        Hour   # Calls Completed              Hour   # Calls Completed
        1500        405                       0300        0
        1400        894                       0200        0
        13**        201                       0100        0
        1200        801                       0000        3
        1100        758                       2300        21
        1000        621                       2200        12
        0900        473                       2100        24
        0800        234                       2000        21
        0700        103                       1900        34
        0600        42                        1800        65
        0500        26                        1700        211
        0400        2                         1600        543
Command successfully completed
enter command:
```

Figure 3-14. Call Summary Measurements Report Screen

Data is displayed beginning from the most recently completed hour and going backward for 24 consecutive hours. For example, since the report is displayed during the 1600-hour time interval, the last completed hour is 1500. Therefore, the left hour column begins with 1500 and lists (from top to bottom) the 12 preceding hours. Subsequently, the right column lists (from top to bottom) the next 12 hours.

**NOTE:**

This report indicates that the system clock was reset during the 1300 hour interval. Therefore, the hour is displayed as 13 * *.



Table 3-8. Call Summary Measurements Report

| Field | Description |
|---|---|
| Hour | *Measurement Hour. The* starting time (using 24-hour clock) of the hour during which the data was recorded. |
| # of Calls Completed | The total number of calls completed during the listed hour. Calls are counted in the hour they are answered and not in the hour they are dropped. Therefore, a call that starts in one hour and ends in another hour is counted only in the hour it originates.<br><br>Suggested Action: To determine the types of calls during the measurement hour, use the List Measurements Occupancy Summary Report. |

# Call Coverage Measurements

There are two reports that provide measurement information about call coverage.

- The Coverage Path Measurement Report describes coverage activity as it relates to the coverage paths.
- The Principal Coverage Measurement Report describes coverage activity as it relates to the principal extensions.

For each report, there is a selection form that lists the specific coverage paths or principal extensions to be measured.

These reports are used to provide information on what happens to calls that go to coverage. The reporti can be used to refine and improve call coverage patterns and to manage the system's principals. The reports are used in conjunction with the list coverage-paths and display coverage-paths sender-group [number].

## Terms

Typically, a principal is the party or group for which a call is originality intended. A principal maybe a station user, a hunt group, a terminating extension group, or a Personal CO Line (PCOL).

Trunk Access Codes (TACs) are used to access the PCOL groups.

For further information concerning coverage, refer to *DEFINITY® Communications System Generic 1 and Generic 3—Feature Description, 555-203-201.*

# Feature Interaction

### Bridged Call

A call answered by a bridge of a coverage point extension is considered answered by the coverage point. A call answered by the bridge of a principal is considered answered by the principal.

### Call Pick-up

If the principal is a member of a pickup group, a call ringing at the principal and picked up by a member of the pickup group is considered answered by the principal. If the coverage point extension is a member of a pickup group, a call ringing at the coverage point and picked up by a member of the pickup group is considered answered by the coverage point.

## Leave Word Calling and Automatic Callback

A call for which the calling party activates Leave Word Calling (LWC) or Automatic Callback (ACB) before the call gets redirected and before it gets answered is considered a call back for the principal. If LWC or ACB is activated after the call is redirected, it is considered a call back for the coverage path.

## Trunks



CO trunks and other trunks that have ring-back provided by the CO will repeatedly attempt to complete the call to the principal. Each attempt is considered a new offered call and will be counted for principal or coverage as appropriate.

# Analyzing the Data

## Data Analysis Guidelines

There is no column for answered calls for principals. Normally, you can assume that

*Answered Calls* = Calls Offered - [Calls *Redirected* + *Calls Abandoned* + *Callback]*

However, this is not always the case. A number of interactions affect the totals on the measurement reports so that the column totals will not sum to the total calls offered.

### Call Forwarding

A forwarded call from the principal will be counted as offered or abandoned to the principal. If the call abandons, the call will be counted as abandoned at the principal. If the forwarded-to extension is a measured principal, the call will be counted as an offered call to the forwarded-to extension. but it will not have an “abandon” or a “redirection” associated with it and will appear as answered.

### Bridging and Pickup Groups

The principal, the principal bridge and members of their pickup group(s) all have access to a call even *if it goes to coverage.*

If one of these parties answers the call, the count will show the call was offered to the coverage path without a corresponding count of “answered” or “abandoned.” The count will be thrown off and the columns will not add up.

### Distributed Communications System (DCS)

Call Forwarding abandon interactions are different than those described above if forwarding is done off-switch. In that case, each extension is treated as a principal and calls will be counted as abandoned if the caller drops the call.

When a call is forwarded across DCS it will go to coverage based on the forwarded-to principal’s path criteria rather than the principal’s unless the principal is, using cover-all.

Because the one-switch appearance of DCS is achieved using more than one trunk, ACB and LWC calls are counted as abandoned.

# Coverage Path Measurements Selection Form

**You can select up to 100 coverage paths for measurement.**

Commands



**To display the list of coverage paths that are to be measured, enter:**

display meas-selection coverage-path [print or schedule]

**To change the list of coverage paths that are to be measured, enter:**

change meas-selection coverage-path

**To see a list of all the coverage paths on your system, enter:**

list coverage paths [print or schedule]

Options: **The print and schedule options are available for all but the “change” command.**

## Screen

**Figure 3-15 shows a typical Coverage Path Measurements Selection Form containing entries for the 100 coverage paths to be measured. Table 3-9 describes the data presented in the Coverage Path Measurements Selection Form.**

```
change measured coverage-paths
Switch Name:  Cust_Switch_Name

  Path No    Path No    Path No    Path No    Path No    Path No    Path No
 1: 1      17:        33:        49:        65:        81:        97:
 2: 6      18:        34:        50:        66:        82:        98:
 3: 68     19:        35:        51:        67:        83:        99:
 4:        20:        36:        52:        68:        84:       100:
 5:        21:        37:        53:        69:        85:
 6:        22:        38:        54:        70:        86:
 7:        23:        39:        55:        71:        87:
 8:        24:        40:        56:        72:        88:
 9:        25:        41:        57:        73:        89:
10:        26:        42:        58:        74:        90:
11:        27:        43:        59:        75:        91:
12:        28:        44:        60:        76:        92:
13:        29:        45:        61:        77:        93:
14:        30:        46:        62:        78:        94:
15:        31:        47:        63:        79:        95:
16:        32:        48:        64:        80:        96:

  Command successfully completed
  enter command:
```

Figure 3-15. Coverage Path Measurements Selection Screen

**To add coverage path numbers, use coverage paths with no entry or replace any existing, unneeded coverage paths: Press *RETURN* until the cursor highlights an unneeded path; enter the coverage path you wish to add, or press `CLEAR FIELD` and add the new coverage path. Coverage path numbers do not have to be in numerical order. The actual changes are made whenever `ENTER` is pressed. As always, a command can be aborted by pressing `CANCEL`.**

Table 3-15. Coverage Path Measurements Selection Form

| Field | Description |
|---|---|
| `Path No` | **Displays the numbers of up to 100 coverage paths that are selected for measurement.** |

# Coverage Path Measurements Report

**The Coverage Path Measurements Report contains usage measurements for each of the 100 selected coverage paths from the Coverage Path Measurement Selection form.**

Command



**To display the Coverage Path Measurements Report, enter**

list measurements coverage-path [starting path] [count (1-100)] yesterday-peak/today-peak/last-hour [external] [print or schedule]

*Required Fields and Options:* **There is one required field for this command:** yesterday-peak/today-peak/last-hour. **You must choose one of these. If you select** yesterday-peak, **the activity for yesterday's peak hour will be listed. The peak hour is the hour with the greatest number of calls offered to the coverage path. If you select** today-peak, **the activity for today's peak hour will be listed. If you select last hour, the activity of the most recently completed hour will be listed.**

**There are four options for this command:**

1. coverage path number

   **You may type the number of the coverage path you wish to display. This number must have been previously assigned to one of the 100 numbers on the Coverage Path Measurement Selection form. If you do not enter a number, all the coverage paths will be displayed.**

2. count

   **You must provide a number between 1 and 100.**

3. external

   **This option will produce aversion of the report showing incoming trunk calls only. Attendant extended calls are considered external.**

4. print **or** schedule

   **This option allows you to print the report immediately or schedule it for another time.**

**For example, to display yesterday's peak measurements for coverage path 68, enter:**

list measurements coverage-path 68 count 1 yesterday

## Screen

Figure 3-16 shows a typical screen for the Coverage Path Measurements Report. The time and date that the report was requested are displayed to the right, following the name of the report. Table 3-10 describes the data presented in the report.

```
list measurements coverage-path 68 count 1 yesterday
Switch Name: Customer_Switch Name                Date: 3:00 pm  Fri MAY 4, 1990
                   COVERAGE PATH MEASUREMENTS
Path  Meas   Calls  ------ Criteria -------          Point1     Point2     Point3
No.   Hour   Offrd  Act  Bsy   DA  All  SAC  Cback Ans   Abd  Ans   Abd  Ans  Abd
  68  1400   20       2    0    4    0   14      3   5     2    3     3    1    3
  Command successfully completed
  enter command:
```

Figure 3-16. Coverage Path Measurements Report Screen

Table 3-10. Coverage Path Measurements Report

| Field | Description |
|---|---|
| `Path No` | Lists the numbers of up to 100 coverage paths that are selected for measurement. |
| `Meas Hour` | The starting time (using a 24-hour clock) of the hour during which the greatest number of calls were offered to the coverage path unless it is the last hour. |
| `Calls Offrd` | The total number of calls offered to the path.<br>Suggested Action: If this number is large, review the principal report and investigate why calls are not being answered. To find the principal for this coverage path, execute the display coverage path sender-group [number] command. |
| `Act Criteria` | The number of calls offered to this path due to the principal being active.<br>Suggested Action: If this number is large compared to `Calls offrd`, you should investigate. A possible reason is that the path was administered for “active” only. |

*Continued on next page*

Table 3-10. Coverage Path Measurements Report (Continued)

| Field | Description |
|---|---|
| Buy Criteria | The number of calls offered to this path due to the principal being busy. |
| DA Criteria | The number of calls offered to this path because the principal didn't answer the call after the administered number of rings. To find the administered number of rings, execute the display coverage-path [number] command.<br><br>Suggested Action: If this number is large compared to Calls Offrd, investigate the reason these calls are leaving the principal. A possible reason is, the path was administered for "don't answer" only. |
| All Criteria | The number of calls offered to this path due to the use of Cover All. |
| SAC Criteria | The number of calls offered to this path due to the principal's use of Send All Calls, or the calling party using Go To Coverage.<br><br>Suggested Action: If this number, or All Criteria, are unusually large, you should investigate why calls are still being offered to this principal. |
| Cback | The number of calls offered to this path where the calling party used LWC or ACB before a coverage point answered the call. These cases are separated out because they are usually considered abandons but counting them as such would be misleading.<br><br>Suggested Action: If this number appears high, verify why calls are not being answered. |
| Point Ans | The total number of calls answered by the specified point. |
| Point Abs | The total number of calls abandoned by the caller while ringing at the specified point.<br><br>Suggested Action: If this number is high, it maybe advisable to re-engineer the coverage paths so less traffic is offered. |

# Principal Coverage Measurements Selection Form

You can select up to 100 principal extensions or TACS for measurement.

For definitions of principals and TACS, refer to "Terms" earlier in the "Call Coverage Measurements' section.

## Commands

To display the list of principal extensions that are to be measured, enter:

display meas-selection principal [print or schedule]

To change the list of principal stations that are to be measured, enter:

change meas-selection principal

## Screen

Figure 3-17 shows a typical Principal Coverage Measurements Selection Form containing entries for the 100 principal extensions or TACs to be measured. Table 3-11 describes the data fields presented in the Principal Coverage Measurements Selection Form.

```
change measurements principal
Switch Name: Cust_Switch_Name
                                MEASURED PRINCIPALS
    Ext/TAC     Ext/TAC     Ext/TAC     Ext/TAC     Ext/TAC     Ext/TAC     Ext/TAC
  1: 76068  17:         33:         49:         65:         81:         97:
  2: 76069  18:         34:         50:         66:         82:         98:
  3: 76075  19:         35:         51:         67:         83:         99:
  4:        20:         36:         52:         68:         84:        100:
  5:        21:         37:         53:         69:         85:
  6:        22:         38:         54:         70:         86:
  7:        23:         39:         55:         71:         87:
  8:        24:         40:         56:         72:         88:
  9:        25:         41:         57:         73:         89:
 10:        26:         42:         58:         74:         90:
 11:        27:         43:         59:         75:         91:
 12:        28:         44:         60:         76:         92:
 13:        29:         45:         61:         77:         93:
 14:        30:         46:         62:         78:         94:
 15:        31:         47:         63:         79:         95:
 16:        32:         48:         64:         80:         96:
  Command successfully completed
  enter command:
```

Figure 3-17. Principal Coverage Measurements Selection Screen

**To add extension numbers, replace any existing, unneeded extension numbers. To do this, press *RETURN* untilthe cursor highlights an unneeded extension number and enter the extension number you wish to add, or press `CLEAR FIELD` and add the new extension number. Extension numbers do not have to be in numerical order. The actual changes are made when you press ENTER. As always, a command can be aborted by pressing CANCEL.**

Table 3-11. Principal Coverage Measurements Selection Form

| Field | Description |
|---|---|
| `Ext/TAC` | Lists the extension or TAC numbers of up to 100 principals whose coverage is selected for measurement. |

# Principal Coverage Measurements Report

The Principal Coverage Measurements Report contains usage measurements for each of the 100 selected principal extensions or TACs from the Principal Coverage Measurements Selection form.

## Command

To display the Principal Coverage Measurements Report, enter:

list measurements principal [starting extension/tac] count(1-100) last-hour/today-peek/yesterday-peak [print or schedule]

*Required Fields and Options:* There is one required field for this command: last hour/today-peak/yesterday-peak. You must choose one of these. If you select last hour the activity of the most recently completed hour will be listed. If you select today-peak the activity for today's peak hour will be listed. If you select yesterday-peak, the activity for yesterday's peak hour will be listed. The peak hour is the hour when the greatest number of calls was offered.

Three options are available for this command:

1. starting extension/tac where you enter the number of the extension or TAC you wish to display. This number must have been previously assigned to one of the 100 numbers on the Principal Coverage Measurement Selection form.
2. count for which you must provide a number,
3. print or schedule.

For example, to display yesterday's measurements for extension 76068 and the next two principals, in order, enter:

list measurements principal 76068 count 3 yesterday

## Screen

Figure 3-18 shows a typical screen for the Principal Coverage Measurements Report. The time and date that the report was requested are displayed to the right, following the name of the report. Table 3-12 describes the data presented in the report.

```
list measurements principal 76068 count 3 yesterday-peak
Switch Name:  Cust_Switch_Name                    Date: 9:14 am  SAT MAY 5, 1990
                                    Principal Measurements
                          Meas Calls       --------Criteria-------
Ext/TAC Hour  Offrd  Aband   Redir  Act  Bsy  DA  All  SAC  Cback Coverage-Paths
76068   1000  120        6     15    0   15   0  0     0    0     12
76069   1100    8        0      0    0    0   0  0     8    0      1
76075   1400   40        4     30   15   15   0  0     0    5      1    2      5
  Command successfully completed
  enter command:
```

Figure 3-18. Principal Coverage Measurements Report Screen

Table 3-12. Principal Coverage Measurements Report

| Field | Description |
|---|---|
| Ext /TAC | The principal extension or PCOL group/TAC being reported. |
| Hour | Measurement Hour The starting time (using 24-hour clock) of the hour during which the data was recorded. |
| Meas calls Offrd | The total number of calls offered to the principal. |
| Mess calls Aband | The total number of calls where the calling party hung up before the call was answered or sent to coverage.<br>Suggested Action: If this number is high at the principal, you may need to redirect traffic.<br>*The number of calls answered by principal =*<br>*Calls Offered - Calls Abandoned - Calls Redirected* |
| Mess Calls Redir | The total number of calls not answered by the Ext/TAC and subsequently sent to coverage.<br>Suggestion Action: If this number is large compared to Meas Calls Offrd, investigate the reasons. |
| Act Criteria | The number of calls sent to coverage by this principal due to the principal being active. |
| Bsy Criteria | The number of calls sent to coverage by this principal due to the principal being busy. |
| DA Criteria | The number of calls sent to coverage by this principal because the principal didn't answer the call after the administered number of rings when executing the display coverage-path [number] command. |
| All Criteria | The number of calls sent to coverage by this principal due to the principal's use of Cover All. |
| SAC Criteria | The number of calls sent to coverage by this principal due to the principal's use of Send All Calls, or because the calling party used the Go To Cover feature. |
| Cback | The number of calls offered to this principal where the calling party used LWC or ACB before the principal answered the call and before it went to coverage. These cases are separated out because they look like abandons and counting them as such would be misleading. |
| Coverage-Paths | The coverage paths used by this principal. To find the associated extensions, enter the display coverage sender-group command. |

## DS1 Link Performance Measurements

This section describes performance measurements for DS1 links. It includes the DS1 Link Performance Measurements Summary Report and the DS1 Link Performance Measurements Detailed Log Report.

**NOTE:**
The DS1 links may be provided by either the TN722, TN767, or TN464 circuit pack. However, the measurements are only kept for the TN767 and TN464 circuit pack.

Many conventional error measurements have relied on the parameter Bit Error Ratio to describe the quality of digital transmission facilities. However, with DS1 links, when errors do occur, they tend to be as error bursts rather than single bit errors. Therefore, the Errored Second, Bursty-Errored Second, Severely-Errored Second, and Failed Second measurements more accurately describe the operational characteristics of DS1 links.

DS1 link performance is based on the number of error events counted per second. An error event is defined as any one of the following:

*Misframe.* An error that is detected as an erroneous bit pattern in any single frame.

*Slip.* An error that is detected as the deletion or repetition of a single frame.

*Extended Superfame Format (ESF CRC-6 Error.* A data communications error over a DS1 link using the ESF format which is detected as a mismatch between the calculated CRC-6 (6-bit cyclic a redundancy check) character appended to the transmitted data and the CRC-6 character recalculated by the receiver.

DS1 link performance is measured by the following error event counts:

*Errored Second.* Any second that contains one or more error events.

For a 24-hour period, the percent of Error Free Seconds (%EFS) is defined as:

$$\%EFS = \left(1 - \frac{\text{Errored Seconds}}{\text{Error Free Seconds}}\right) \times 100$$

$$\%EFS = \left(1 - \frac{\text{Errored Seconds}}{\text{Total Seconds} - \text{Errored Seconds}}\right) \times 100$$

Bursty-Errored Second. Any second that contains from 2 to 319 error events.

*Severely-Errored Second.* Any second that contains 320 or more error events.

*Failed Second.* A state that exists when tenor more consecutive severely-errored seconds were detected, A Failed Second state is cleared when no severely-errored seconds are detected for a period of 10 consecutive seconds.

**NOTE:**
Such events as a Failed Second or Severely-Errored Second typically result in a serious impact on the customers' applications.

If the errors become too severe, an alarm is raised. The actual rate that the errors occurred at determines whether the alarm is minor or major. *DEFINITY® Communications System Genetic 3r—Maintenance, 555-230-705,* identifies the recommended procedures that maintenance personnel should perform to resolve these alarms.

The error event counters, located on each DS1 Interface circuit pack, are polled every 900 seconds (15 minutes). The data is available for up to 24 hours, and measurement data older than 24 hours is overwritten by the current measurement data.

A system reboot from tape clears the error event counters. The DS1 error event counters may also be cleared by entering the following maintenance command:

clear meassurements ds1 NNCSS

This command uses the following qualifiers:

NN = port network number (1-22)
C = carrier (A-E)
SS = slot (01-21)

All DS1 error event counters have a maximum range of 65535, after which they recycle and begin counting from zero again. If a TN767 or TN464 circuit pack is removed, or taken out of service, data for that circuit pack is not available for the time periods that it is removed.

3

# DS1 Link Performance Measurements Summary Report

**The DS1 Link Performance Measurements Summary Report provides an indication of the quality of a DS1 link that connects to a DS1 Interface circuit pack**

## Command

**To display the DS1 Link Performance Measurements Summary Report, enter:**

list measurements ds1 NNCSS [print or schedule]

**This command uses the following qualifiers:**

**NN** = **port network number (1-22)**
**C** = **carrier (A-E)**
**SS** = **Slot (01-21)**

*Options:* **The print and schedule options are available for this command.**

## Screen

**Figure 3-19 shows a typical screen (depicting a DS1 interface that is experiencing errors) for the DS1 Link Performance Measurements Summary Report. Table 3-13 describes the data fields presented in DS1 Link Performance Measurements Summary Report.**

```
list measurements ds1 1c05
Switch Name: Cust_Switch_Name                      Date: 2:42 pm WED SEP 25, 1991
               DS-1 Link Performance Measurements Summary Report
    Counted Since: 6:32 pm THU SEP 19, 1991
    Number of Seconds Elapsed Into Current 15-min Interval: 620
    Total of Valid 15-min Intervals in Past 24-hr Period:  96
                                                  Total of    Current
                    Worst 15-Min Interval         24-Hour     15-Min Interval
     Category       Date     Time    Count         Count      Count
Errored Sec         9/24     14:32     0             0          0
Bursty Err Sec      9/24     14:32     0             0          0
Severely Err Sec    9/24     14:32     0             0          0
Failed Sec          9/24     14:32     0             0          0
```

Figure 3-19. DS1 Link Performance Measurements Summary Report Screen

Table 3-13. DS1 Link Performance Measurements Summary Report

| Field | Description |
|---|---|
| count ad since : | The date and time that the counters were last cleared and restarted. The counters are set to 0 and start accumulating data when the system is administered or reinitialized. The current system time appears in the field after the system clock is set.<br><br>Since the Counted since field is calculated based on the current time, an error message is prompted back to the user if the system clock has not been set following a system reinitialization. |
| Number of Seconds Elapsed Into Current 15-min Interval: | The number of seconds (0 to 900) that have been counted in the current 15-minute interval. |
| Total of Valid 15-min Intarvals in Past 24-hr Period: | The total number of 15-minute intervals (zero to 96) in the past 24-hour period that have valid values.<br><br>NOTE:<br>An invalid interval is any 15-minute interval during which (a) the system clock was changed, (b) a system reinitialization occurred, or (c) the specified TN767 or TN464 circuit pack was pulled from the carrier. Refer to the DS1 log report for details. |
| Worst 15-Min Interval | The date, ending time, and count for the 15-minute period that contained the maximum count in each error category. If there are no errors, the field will display O with the oldest time. |
| Total of 24-Hour Count | The total count in each error category for the last 24-hour period (0 to 65535). Refer to the DS1 log report to view the last 96 intervals. |
| Current 15-Min Interval count | The count-so-far in each error category for the 15-minute interval in progress when the report was requested. If no errors have occurred yet in any of the categories during the current 15-minute interval, the respective field will contain the number O. If the system is busy performing call processing functions and cannot respond within 8 seconds, then the field will display N/A. |

# DS1 Link Performance Detailed Log Report

The DS1 Link Performance Measurements Detailed Log Report lists errored event records for the past 24 hours. The errored event records are listed for each 15-minute interval. This would show the 96 records (the number of 15-minute intervals in 24 hours) from the current 15-minute interval back to 24 hours before the current interval, beginning with the oldest record.



## Command

To display the DS1 Link Performance Measurements Detailed Log Report, enter:

list measurements ds1-log NNCSS print or schedule]

This command has the following qualifiers:

NN = port network number (1-22)
C = carrier (A-E)
SS = slot (01 -21)

Options: The print and schedule options are available for this command.

## Screen

Figures 3-20 and 3-21 show a typical screen for the DS1 Link Performance Measurements Detailed Log Report. Table 3-14 describes the data fields presented in the DS1 Link Performance Measurements Detailed Log Report.

```
list measurements dsl-log 1c05                                    Page 1  SPE A
Switch Name: Cust_Switch_Name                   Date: 2:43 pm WED SEP 25, 1991
               DS-1 Link Performance Measurements Detailed Log Report
     Counted Since: 6:32 pm THRU SEP 19, 1991
                     ERRORED     BURSTY      SEVERELY       FAILED    VALID
    DATE     TIME    SECOND      ERR SEC     ERR SEC        SECOND    INTERVAL
    9/24     14:47     0           0           0              0          Y
    9/24     15:02     0           0           0              0          Y
    9/24     15:17     0           0           0              0          Y
    9/24     15:32     0           0           0              0          Y
    9/24     15:47     0           0           0              0          Y
    9/24     16:02     0           0           0              0          Y
    9/24     16:17     0           0           0              0          Y
    9/24     16:32     0           0           0              0          Y
    9/24     16:47     0           0           0              0          Y
    9/24     17:02     0           0           0              0          Y
```

Figure 3-20. DS1 Link Performance Measurements Detailed Log Report Screen

```
list measurements dsl-log 1c05                                    Page 2
Switch Name: Definity G3 In-house                   Date: 2:43 pm WED SEP 25, 1991
               DS-1 Link Performance Measurements Detailed Log Report
     Counted Since: 6:32 pm THRU SEP 19, 1991
                     ERRORED     BURSTY      SEVERELY       FAILED    VALID
    DATE     TIME    SECOND      ERR SEC     ERR SEC        SECOND    INTERVAL
    9/24     17:17     0           0           0              0          Y
    9/24     17:32     0           0           0              0          Y
    9/24     17:47     0           0           0              0          Y
    9/24     18:02     0           0           0              0          Y
    9/24     18:17     0           0           0              0          Y
    9/24     18:32     0           0           0              0          Y
    9/24     18:47     0           0           0              0          Y
    9/24     19:02     0           0           0              0          Y
    9/24     19:17     0           0           0              0          Y
    9/24     19:32     0           0           0              0          Y
```

Figure 3-21. DS1 Link Performance Measurement Detailed Log Report Screen

Table 3-14. DS1 Link Performance Measurements Detailed Log Report

| Field | Description |
|---|---|
| Date | The date on which the event occurred will be yesterday or today. |
| Time | The ending times for the 15-minute sampling intervals. |
| Errored Second | The number of errored seconds for the specified interval (maximum of 900). An errored second is any second in which one or more data transmission errors occurred. N/A indicates that the count for that interval was not available, typically because there is no data. |
| Bursty Err Sec | The number of bursty errored seconds for the specified interval (maximum of 900). A bursty errored second is any second in which 2 to 319 data transmission errors occurred. N/A indicates that the count for that interval was not available. An error count of this severity results in a minor alarm.<br><br>Suggested Action: **Resolution of the alarm should, in most cases, be the function of maintenance personnel. Depending upon local arrangements, it may be appropriate to alert maintenance personnel if they have not already been alerted.** |
| Severely Err Sec | The number of severely errored seconds for the specified interval (maximum of 900). A severely errored second is any second in which 320 or more data transmission errors occurred. An error count of this severity results in a major alarm. N/A indicates that the count for that interval was not available.<br><br>Suggested Action: **Resolution of the alarm should, in most cases, be the function of maintenance personnel. Depending upon local arrangements it may be appropriate to alert maintenance personnel if they have not already been alerted.** |

*Continued on next page*

Table 3-14. DS1 Link Performance Measurements Detailed Log Report (Contiued)

| Fieid | Description |
|---|---|
| Failed Second | The number of failed seconds states for the specified interval (maximum of 900). A failed second state exists anytime that 10 or more consecutive Severely-errored seconds have occurred. An error count of this severity results in a major alarm.N/A indicates that the count for that interval was not available.<br><br>Suggested Action: Resolution of the alarm should, in most cases, be the function of maintenance personnel. Depending upon local arrangements, it maybe appropriate to alert maintenance personnel, if they have not already been alerted. |
| Valid Interval | The `valid Interval` field indicates whether (Y for yes) or not (N for no) a valid count is provided by the DS1 Interface circuit pack. A value of Y indicates that all counts are valid for the interval.<br><br>**NOTE:**<br>An invalid interval is any 15-minute interval during which (a) the system clock was changed, (b) a system reinitialization occurred, or (c) the specified circuit pack was pulled from the carrier. |

# DS1 Converter Reports

This section describes performance measurements for the four facilities associated with a DS1 Converter (DS1C) board (TN574). It includes the DS1C Link Performance Measurements Summary Report and the DS1C Link Performance Log Report.



The DS1C board is part of the DS1 Converter Complex (DS1CC) which consists of two DS1C boards connected by between 1 and four facilities (DS1 Facility).

Errors on DS1 facilities tend to occur in error bursts rather than single bit errors. Therefore, Errored Seconds, Bursty Errored Seconds, Severely Errored Seconds and Failed Second Measurements accurately describe the operational characteristics of DS1 facilities.

There are two DS1 Converter Performance Measurements sub-reports:

1. The DS1 Converter Performance Measurements Summary Report provides information about the worst 15 minute interval of data, the total for 24 hours of data and the current 15 minute counter for each of the types of data measured.
2. The DS1 Converter Performance Measurements Detailed Report displays a detailed log for the last 96 15-minute intervals for each of the types of data measured.

DS1 facility performance is based on the number of error events counted per second. An error event is defined as any one of the following:

*Misframe.* An error that is detected as an erroneous bit pattern in any single frame.

*Slip.* An error that is detected as the deletion or repetition of a single frame.

Extended Superframe Format (ESF) CRC-6 *Error.* A data communications error over a DS1 facility using the ESF format which is detected as a mismatch between the calculated CRC-6 (6-bit cyclic a redundancy check) character appended to the transmitted data and the CRC-6 character recalculated by the receiver.

DS1 link performance is measured by the following error event counts:

*Errored Second* Any second that contains one or more error events.

For a 24-hour period, the percent of Error Free Seconds (%EFS) is defined as:

$$\%EFS = \left(1 - \frac{\text{Errored Seconds}}{\text{Error Free Seconds}}\right) \times 100$$

$$\%EFS = \left(1 - \frac{\text{Errored Seconds}}{\text{Total Seconds} - \text{Errored Seconds}}\right) \times 100$$

*Bursty-Errored Second.* Any second that contains from 2 to 319 error events.

*Severely-Errored Second.* Any second that contains 320 or more error events.

*Failed Second.* A state that exists when tenor more consecutive severely-errored seconds were detected. A Failed Second state is cleared when no severely-errored seconds are detected for a period of 10 consecutive seconds.

**NOTE:**
Such events as a Failed Second or Severely-Errored Second typically result in a serious impact on the customers' applications.

If the errors become too severe, an alarm is raised. The actual rate that the errors occurred at determines whether the alarm is minor or major. *DEFINITY® Communications System Genetic 3r-Maintenance, 555-230-105,* identifies the recommended procedures that maintenance personnel should perform to resolve these alarms.

The error event counters, located on each DS1C board for each administered facility, are polled every 900 seconds (15 minutes). The data is available for up to 24 hours, and measurement data older than 24 hours is overwritten by the current measurement data.

A system reboot from tape clears the error event counters. The DS1 error event counters may also be cleared by entering the following maintenance command:

```
clear measurements ds1 NNCSSF
```

This command uses the following qualifiers:

NN = port network number (1-22)
C = wrier (A-E)
SS = slot (01-21)
F = facility number (A-D)

**All DS1C facility error event counters have a maximum range of 65535, after which they recycle and begin counting from zero again. If a TN574 circuit pack is removed, or taken out of service, data for that circuit pack is not available for the time periods that it is removed.**

Commands

**To display the DS1C Performance Measurements Summary, enter:**

list measurements ds1-facility summary NNCSSF [print or schedule]

**This command uses the same qualifers as the "clear measurements" command above.**

Options: **The print and schedule options are available for this command.**

**To display the DS1C Performance Measurements Detailed report, enter**

list measurements ds1-facility log NNCSSF [print or schedule]

**This command uses the same qualifiers as the 'clear measurements" command above.**

**The user can reset all software counters associated with the specified DS1C circuit pack facility. The** Counted Since **time is also reset and the** Number of Valid Intervals **count is set to zero.**

Options: **The print and schedule options are available for this command.**

**To clear the DS1C measurements, enter:**

clear measurements ds1-fscility NNCSSF [print/schedule]

**This command uses the same qualifiers as the "clear measurements" command above.**

## Screens

**Figure 3-22 shows a typical screen for the DS1-Facility Summary report; Figures 3-23 and 3-24, a typical screen for the DS1-Facility Log report. Table 3-15 provides details about the fields in the DS1-Facility Summary report; Table 3-16, about the DS1 -Facility Log report.**

```
list measurements ds1-facility summary 1c21a
Switch Name: Cust_Switch_Name                       Date: 2:51 pm WED SEP 25, 1991
              DS1C Link Performance Measurements Summary Report
Counted Since:  9:03 am WED SEP 25, 1991
Number of Seconds Elapsed Into Current 15-min Interval: 86
Total of Valid 15-min Intervals in Past 24-hr Period: 22
                                                 Total of    Current
                     Worst_15-Min_Interval       24-Hour     15-Min Interval
    Category         Date     Time     Count     Count       Count
Errored Seconds      9/24     09:03        0         0           0
Bursty Err Secs      9/24     09:03        0         0           0
Severely Err Secs    9/24     09:03        0         0           0
Failed Seconds       9/24     09:03        0         0           0
```

Figure 3-22. DS1-Facility Summary Report Screen

Table 3-15. DS1C Performance Measurements Summary Report

| Field | Description |
|---|---|
| `Counted since` | **The date and time when the associated measurement counters were cleared or the DS1C facility was administered.**<br><br>**The counters are set to 0 and start accumulating data when the system is administered or re-initialized. The current system time appears in the field after the system clock is set.**<br><br>**Since the Counted Since field is calculated based on the current time, an error message is prompted back to the user if the system clock has not been set following a system re-initialization.** |

*Continued on next page*

Table 3-15. DS1C Performance Measurements Summary Report (Continued)

| Field | Description |
|---|---|
| Number of Seconds Elapsed Into Current 15-min Interval | The number of seconds (0 to 900) that have been counted in the current 15-minute interval. |
| Total of Valid 15-min Intervals in Past 24-hr Period | The total number of 15-minute intervals (0 to 98) in the past 24-hour period that contain valid data.<br><br>**NOTE:**<br>An invalid interval is any 15-minute time interval during which (a) the system clock was changed, (b) a system re-initialization occurred, or (c) the specified TN754 circuit pack was pulled from the carrier. Refer to the DS1C log report for details. |
| Worst 15-Min Interval | The date, ending time, and count for the 15-minute period that contains the maximum value for each error category (errored seconds, bursty errored seconds, severely errored seconds, and failed seconds). If there are no errors, the field will display 0 with the oldest time. |
| Total of 24-Hour Count | The total count in each error category for the last 24-hour period (0 to 65535). Refer to the DS1 log report to view the last 98 intervals. |
| Current15-Min Internal Count | The count so far in each category for the 15-minute interval in progress when the report was requested. If no errors have occurred yet in any of the categories during the current 15-minute interval, the respective field will contain the number 0. If the system is busy performing call processing functions and cannot respond within 8 seconds, the field will display for the current (incomplete) 15-minute interval for each N/A. |

```
list measurements ds1-facility log 1e21a                                  Page 1
Switch Name: Cust_Switch_Name                   Date: 2:55 pm WED SEP 25, 1991
             DS1C Link Performance Measurements Detailed Log Report
Counted Since:  9:03 am WED SEP 25, 1991
                ERRORED     BURSTY      SEVERELY    FAILED      VALID
Date    Time    SECONDS     ERR SECS    ERR SECS    SECONDS     INTERVAL
9/25    09:18      0           0           0           0           y
9/25    09:33      0           0           0           0           y
9/25    09:48      0           0           0           0           y
9/25    10:03      0           0           0           0           y
9/25    10:18      0           0           0           0           y
9/25    10:33      0           0           0           0           y
9/25    10:48      0           0           0           0           y
9/25    11:03      0           0           0           0           y
9/25    11:18     N/A         N/A         N/A         N/A          n
9/25    11:33      0           0           0           0           y
        press CANCEL to quit -- press NEXT PAGE to continue
```

Figure 3-23. DS1-Facility Log Report Screen

```
list measurements del-facility log 1e21a                                Page 2
Switch Name: Cust_Switch_Name                 Date: 2:55 pm WED SEP 25, 1991
               DS1C Link Performance Measurements Detailed Log Report
     Counted Since: 9:03am WED SEP 25, 1991
                   ERRORED     BURSTY      SEVERELY       FAILED     VALID
    DATE    TIME   SECOND      ERR SEC     ERR SEC        SECOND     INTERVAL
    9/25    11:48    0           0           0              0          Y
    9/25    12:03    0           0           0              0          Y
    9/25    12:18    0           0           0              0          Y
    9/25    12:33    0           0           0              0          Y
    9/25    12:48    0           0           0              0          Y
    9/25    13:03    0           0           0              0          Y
    9/25    13:18    0           0           0              0          Y
    9/25    13:33    0           0           0              0          Y
    9/25    13:48    0           0           0              0          Y
    9/25    14:03    0           0           0              0          Y
```

Figure 3-24. DS1-Facility Log Report Screen

Table 3-16. DS1C Performance Measurements Detailed Log Report

| Field | Description |
|---|---|
| Date | The time and date of the current report. |
| collated since | The start time and date when the associated measurement counters were cleared or the DS1C facility was administered. |
| Date and Time) | The date and end time of the 15-minute interval. |
| Errored seconds | The number of the erorred seconds for the specified 15-minute interval (maximum of 900). An errored second is any second in which one or more data transmission errors occurred. "N/A" indicates that the count for that interval was not available, typically because there is no data. |
| Bursty Err Sec | The number of bursty errored seconds for the specified interval (maximum of 900). A bursty errored second is any second in which 2 to 319 data transmission errors occurred. "WA indicates that the count for that interval was not available. An error count of this severity results in a minor alarm.<br><br>Suggested Action: **Resolution of the alarm should, in most cases, be the function of maintenance personnel. Depending upon local arrangements, it maybe appropriate to alert maintenance personnel if they have not already been alerted.** |
| Severely Err Sec | The number of the severely errored seconds counter for the specified interval (maximum of 900). A severely errored second is any second in which 320 or more data transmission errors occurred. An error count of this severity results in a major alarm. WA indicates that the count for that interval was not available.<br><br>Suggested Action: **Resolution of the alarm should, in most cases, be the function of maintenance personnel. Depending upon local arrangements it may be appropriate to alert maintenance personnel, if they have not already been alerted.** |

*Continued on next page*

Table 3-16. DS1C Performance Measurements Detailed Log Report (Continued)

| Fieid | Description |
|---|---|
| `Failed Second` | The value of the failed seconds counter for the specified interval (maximum of 900). A failed second state exists anytime that 10 or more consecutive severely errored seconds have occurred. An error count of this severity results in a major alarm. N/A indicates that the count for that interval was not available.<br><br>Suggested Action: Resolution of the alarm should, in most oases, be the function of maintenance personnel. Depending upon local arrangements, it maybe appropriate to alert maintenance personnel, if they have not already been alerted. |
| `Valid Interval` | The `Valid Interval` field indicates whether (Y for yes) or not (N for no) a `valid count` is provided by the DS1 interface circuit pack A value of Y indicates that all counts are valid for the interval.<br><br>**NOTE:**<br>An invalid interval is any 15-minute time interval during which (a) the system clock was changed, (b) a system re-initialization occurred, or (c) the specified circuit pack was pulled from the carrier. |

## Hunt Groups

This section describes the traffic measurements, performance, and status reports for ACD/UCD/DDC Hunt Groups and provides the analysis of

For more detailed ACD measurements, the BCMS or CMS option is recommended. Contact your AT&T Account Team.



## Hunt Group Measurements Report

The Hunt Group Measurements Report assists you in monitoring and managing the DDC and UCD hunt groups, and ACD splits. These features permit incoming calls to be terminated directly to a prearranged group of answering positions.

This report shows hunt group measurements for yesterdays peak hour, today's peak hour (as of the time of day that this report is run), and the last hour. A peak hour is the hour within a 24-hour period that had the greatest usage for the Specified day.

### Command

To display the Hunt Group Measurements Report, enter:

`list measurements hunt-group [options] [print] or [schedule]`

***Options:*** **Options are** `yesterday-peak` **for yesterday's report,** `today-peak` **for today's report, or** `last hour` **for a report of the activity from the last completed measurement hour.**

### Screen

Figure 3-25 shows a typical screen for the Hunt Group Measurements Report, using the yesterday-peak option. The time and date that the report was requested is displayed following the name of the command.

Table 3-17 describes the data presented in the Hunt Group Measurements Report.

```
list measurements hunt-group last hour
Switch Name: Customer-Name                  Date: 1:55 pm  MON SEP 16, 1991
                                    HUNT GROUP MEASUREMENTS
                                                                         Speed
Grp Grp              Grp  Grp  Meas  Total Calls Calls Que  Calls Que  Time  Ans.
No. Name             Size Type Hour  Usage Ans.  Aban. Size Que.  Ovfl Avail (sec.)
1   SAP              7    ucd  1200  139   2     0     0    0     0    113   0
2   Group 84000      0    ucd  1200  0     0     0     0    0     0    0     0
3   Group 86000      0    ucd  1200  0     0     0     0    0     0    0     0
5   Test Hunt        2    ucd  1200  0     0     0     0    0     0    72    0
10  Warehouse        1    ddc  0800  10    3     0     5    0     0    26    5
11  Agent-answer     6    ucd  1200  72    0     0     0    0     0    144   0
12  Group 1          12   ucd  1200  151   3     0     0    0     0    281   0
13  Group 2          56   ucd  1200  0     0     0     0    0     0    376   0
14  Group 3          56   ucd  1200  0     0     0     0    0     0    793   0
30  Hotline 0             ucd  1200  0     0     10    0    0     0    0     0
31  Lab Test         0    ucd  1200  0     0     10    0    0     0    0     0
32  ACD Hotline      0    ucd  1200  0     0     10    0    0     0    0     0
```

Figure 3-25. Hunt Group Measurements Report Screen

Table 3-17. Hunt Group Measurements Report

| Field | Description |
|---|---|
| GrP No. | ***Group Number.*** **A number from 1 through 255 that idetifies each hunt group.** |
| Grp Name | ***Group Name.*** **Name assigned, during administration, to the hunt group.** |
| Grp Size | **Group Size. The number of extension sassigned to the hunt group (not necessarily staffed) may range from one through 999.** |

***Continued on next page***

Table 3-17. Hunt Group Measurements Report (Continued)

| Field | Description |
|---|---|
| Grp Type | *Group Tue.* Identifies the type of hunt group, which maybe one of the following:<br>■ DDC<br>■ UCD |
| Mess Hour | *Measurement Hour.* For Figure 3-24, the hours displayed are the peak hours for that particular hunt group. Obviously, depending on the time of day that this report is produced, may yield different today's peak hour data. |
| Total Usage | *Total Usage. The* sum of all times (in CCS) that the members of a hunt group are busy on hunt group calls. Total Usage is the most important parameter for this report. The maximum possible usage is:<br><br>*Maximum Possible Usage = 36 CCS* X Total # Of *Member*<br><br>Suggested Action: If the Total Usage number approaches the total CCS, you may consider adding another extension to the hunt group but only staffing it during the peak hours. If the hunt group has several extensions and the Total Usage is low, this maybe acceptable if the personnel perform other duties. |
| calls Ans | *Calls Answered.* The total number of all hunt group calls answered by the hunt group. Calls to non-ACD hunt groups which are answered by a coverage point are recorded as calls answered. |

*Continued on next page*

Table 3-17. Hunt Group Measurements Report (Continued)

| Field | Description |
|---|---|
| Calls Aban | *Calls Abandoned.* The total number of calls which attempt to reach the hunt group but abandon the attempt before being answered. Calls may abandon either (1) while in the hunt group queue or (2) while ringing a hunt group extension. This total does not include calls answered by Call Pick Up or other hunt groups, or calls abandoned while listening to a forced first announcement.<br><br>**NOTE**<br>ACD calls which are redirected to other splits within the system via the intraflow feature are not counted as abandoned calls. ACD calls which are redirected to another switch (interflow feature) are not counted as abandoned calls.<br><br>Suggested Actions: Observe times during which the Calls Abandoned number may be higher than desired. Subsequently, consider adding one or more agents to the hunt group and staffing these additional positions during the problem times. Also, see "Suggested Action" in the Total Usage description. |
| Que size | *Queue Size. The* length of the queue assigned to the hunt group during administration.<br><br>Recommendations: There are no specific guidelines for setting queue size. However, the following general recommendations apply. The queue size should be larger than the group size; but, typically not more than three times as large as the group size. An indication that the queue size is too large would be the observance of a higher than expected number for the calls Aban field. An indication that the queue size is too small would be the observance of a smaller than expected number for the Calls Aban field (for example, 0). |
| Calls Que. | *Calls Queued.* Total number of calls that arrive to find all members of the hunt group busy and are placed in the hunt group queue. Calls Queued includes all calls that go to coverage. |
| Queue Ovf1. | *Queue Overflow.* The calls that arrive when all slots in the hunt group queue are occupied. |

*Continued on next page*

Table 3-17. Hunt Group Measurements Report (Continued)

| Field | Description |
|---|---|
| Time Avail | *Time Available.* The total time in CCS that the hunt group extensions are not in use but are available to receive hunt group calls during the measurement hour. Time Available is calculated only when an agent (extension) is ready to receive calls from the specified hunt group.<br><br>For example, If the hunt group had four extensions and each was available for 15 minutes during the measurement hour, the total time available would be 60 minutes or 36 CCS. |
| Speed Ans . | *Speed of Answer.* The average time interval (in seconds) from when the call first enters the hunt group or hunt group queue until the call is answered by a hunt group member. This does not include the time taken by a forced first announcement. |

# Data Analysis Guidelines

The following guidelines are intended to show an easy method for determining whether currently reported data is acceptable or not. These guidelines represent the minimum that you should do to verify that the recorded measurement values are consistent with expected and historic values. You should perform additional checks as necessary.

To check the acceptability of hourly Hunt Group Measurements Reports, verify the following:

- The system clock or group size has not been changed during the measurement hour.
- -The average time agents spend working on calls is typically between 60 and 300 seconds. The actual application and specific types of work being performed may permit you to arrive at a more precise number. If your calculated average call length is out of this range, it should be investigated.

**NOTE:**
Total Usage plus Total Avail (both in CCS) should not exceed 36 times the group size. For example, with a hunt group containing two extensions, total usage measured should not exceed 2x36=72 CCS for data collection.

## Analyzing the Data

The Hunt Group Data Worksheet serves to back up the data from the reports and to provide an easy means for identifying the peak hour. The data from the identified peak hour should be used in subsequent calculations.

Before analyzing data obtained from the hunt group reports, several additional considerations relating to both ACD hunt groups and non-ACD hunt groups need mentioning. These include their similarites and differences.

**NOTE:**
It should be realized that data collected in a real-time environment, such as what actually happens, will virtually always deviate from the theoretically predicted data because of the asynchronous nature of processes and interactions with other events such as maintenance.

## Important Considerations for Both ACD and Non-ACD Hunt Groups

1. *Total Usage:* If the extension is a member of more than one hunt group, then Total Usage will only be accumulated for groups that answer the call. Subsequently, Time Avail is decremented for all groups. For example, assume that extension x3000 belongs to hunt groups 1,2, and 3. Furthermore, assume that a call terminates on hunt group 2 and that x3000 answers the call. The end result is that usage time is accumulated for hunt group 2 (thus increasing Total Usage for group 2 and decrementing Time Avail for groups 1,2, and 3).

   Time (Total Usage) is not accumulated whenever a hunt group member is on an incoming or outgoing personal call.

2. *Time Avail:* If an extension is a member of more than one hunt group, then Time Avail is accumulated for each group. For example, assume that extension x3000 belongs to hunt groups 1,2, and 3. Furthermore, assume that extension x3000 is available for the full measurement hour. The end result is that 36 CCS will be added to Time Avail for hunt groups 1, 2, and 3.

   *Time* (Time Available) is not accumulated whenever a hunt group member is on an incoming or outgoing personal call.

3

## Differences Between Non-ACD and ACD Hunt Groups

### For Non-ACD Hunt Groups

1. *Call Ans:* Incoming calls that route to call coverage (or don't answer criteria) accumulate time (Total Usage and Time Avail) as if they were answered within the hunt group. Furthermore, calls to a hunt group that are picked up by a member of a pickup group are counted as answered within the hunt group. While the coverage point is busy answering a hunt group call, the hunt group member that initially received the call is not available to answer other calls.

2. *Calls Aband:* Incoming calls that route to call coverage (or don't answer criteria) are counted as abandoned, for the hunt group, if the caller hangs up when the call is at the ringing coverage point.

3. Speed *of* Answer: Speed of Answer includes any and all times spent in covering to other stations, but does not include the time spent for forced first announcements.

## For ACD Hunt Groups

1. *Calls Aband:* If the caller hangs-up when the call is in queue or while ringing at the agent's position, the call is counted as abandoned. If all members of an ACD split are logged out or in Aux-work mode, incoming ACD calls will not queue for the split and, therefore, are never counted as abandoned.
2. *Speed of Answer: The Speed of* Answer count is set to zero every time a call reaches a new coverage point.

   **NOTE:**

   Because of this difference, the Speed of Answer values for ACD hunt groups tend to be less (smaller) than for non-ACD type hunt groups.

3. *Call Ans: Calls* that go to call coverage (or don't answer criteria) and are answered at the coverage point are not included in the number displayed for this report. Unlike non-ACD hunt groups, the ACD hunt group member who initially received the call is available to answer other ACD calls while the coverage point is answering the covered call.
4. *Time Avai*— Not accumulated for ACD calls that go to coverage.
5. *Total Usage*— lot accumulated for ACD calls that go to coverage.

## Total Usaage

Total Usage is the sum of all times that the members of a hunt group are busy on incoming group calls.

$$\textit{Total Usage (in seconds)} = \sum \textit{of the Individual Holding Time (in sec)}$$

$$\textit{Total Usage (in seconds)} = \textit{Total Holding Time (in seconds)}$$

3

For demonstration puposes, we will consider hunt group #6 of Figure 3-24. This hunt group has 3 calls. Assume that the call durations were of 480,300, and 220 seconds.

$$\textit{Total Usage (in seconds)} = 480 + 300 + 220 \ \textit{seconds}$$

$$\textit{Total Usage (CCS)} = \frac{1000 \ \textit{seconds}}{100 \ \textit{seconds per CCS}}$$

$$\textit{Total Usage (CCS)} = 10 \ \textit{CCS}$$

## Average Holding Time

With the number of Calls Answered and the number for Total Usage, the average length of time that the hunt group members spend answering the calls (Average Holding Time) may be calculated. The calculation is as follows:

$$\textit{Average Holding Time} = \left[\frac{\textit{Total Usage CCS}}{\textit{Calls Answered}}\right] \times \frac{100 \ \textit{Seconds}}{\textit{CCS}}$$

For demonstration purposes, we will consider hunt group #6 of Figure 3-26.

$$\textit{Average Holding Time} = \left[\frac{10 \ \textit{CCS}}{3 \ \textit{calls}}\right] \times \frac{100 \ \textit{seconds}}{\textit{CCS}}$$

Average *Holding Time = 333 seconds (or 5 minutes* and 33 *seconds per call)*

## Hunt Group Performance Report

**The Hunt Group Performance Report gives the slowest hourly average speed of answer for each hunt group for either the previous day or the current day (yesterday or today) along with the hour the measurement occurred. The report displays the information both graphically and numerically.**

**NOTE:**
**Obviously, if you have previously generated a measurements report for yesterday (for example,** list meaurements hunt group yesterday) **then you will want to generate a performance report with the** yesterday **option. Likewise, if you have previously generated a measurements report with the today option, you will want to generate a performance report with the** today **option. It is possible to relate the information delayed on one report to the information displayed on the other report, provided that both reports are for the same time period, and if needed to suggest appropriate actions.**

Command

**To display the Hunt Group Performance Report, enter:**

list performance hunt group [optima] [print] or [schedule]

Options: **Options are yesterday for yesterday's report, today for today's report, print, or schedule.**

Screen

**Figure 3-26 shows a typical screen for the Hunt Group Performance Report, using the yesterday option.**

**Table 3-18 describes the data field presented in the Hunt Group Performance Report.**



```
list performance hunt-group yesterday
Switch Name: Cust_Switch_Name
Hunt Group Performance                          Today: 6:13 pm  THU MAR 30, 1989
                  SLOWEST HOURLY SPEED OF ANSWER
Grp Grp  Grp  ----- Slowest Speed of Answer (sec) ----  Speed    Meas  Daily
No. Size Type 1 2 3 4 5 6 7 8 9 10 20 40 60 80 100 200  Ans(sec) Hour  Avg.
1   3    ucd  ///                                         2      1800   1
2   2    ddc  ///////////////////////                     23     1500   4
3   5    ddc  //////////////////////                      17     1100   3
4   9    ucd  ///////////////                             8      1100   4
5   2    ucd  ////////////////////////                    31     1500   7
6   1    ddc  ////////////////////                        11     1600   5
7   6    ucd  /////////                                   5      1600   3
8   4    ddc  //////////////////                          10     1600   7
Command successfully completed
enter command:
```

Figure 3-26. Hunt Group Performance Report Screen

Table 3-18. Hunt Group Performance Report

| Field | Description |
|---|---|
| Grp No. | *Group Number.* A number from 1 through 255 that identifies each hunt group. |
| Grp size | *Group Size.* The number of extensions assigned to the hunt group (not necessarily staffed). The range of permitted numbers is 1 through 999. |
| Grp Typo | *Group Type.* Identifies the type of hunt group, which maybe one of the following:<br>■ DDC<br>■ UCD |
| Slowest Speed of Answer (sac) | *Slowest Speed of Answer* in seconds. A bar graph representation of the "slowest hourly average speed of answer" for the report interval (either yesterday or today). |
| Smod Ans (Soc) | *Speed of Answer* in seconds. The number of seconds corresponding to the "slowest hourly average speed of answer" (longest amount of time to answer) for the report interval. This time includes queue time and ring time, but does not include the time spent on a forced first annou-ment. |
| Meas Hour | *Measurement Hour.*<br>Suggested Actions: From analyzing Figure 3-26 you can detetmine that hunt group #5 has the "slowest hourly speed of answer" for all of yesterday. The value was 31 seconds and the time interval was 1500 hours (3:00 p.m. to 4:00 p.m.). If this time interval just so happens to be the peak usage hour as indicated from the list measurements hunt group yesterday report, then consider adding/staffing more agents during the peak hour. |
| Daily Avg . | *Daily Average.* The number corresponding to the 24-hour daily "average speed of answer" for each hunt group.<br>$\text{Daily Average} = \frac{\sum \text{ of the Delays For Each Answered Call}}{\text{Total \# of Answered Calls (so far today)}} EN$ |

# Hunt Group Status Report

**The Status Report gives an instantaneous indication of the load that is pending (number of calls waiting to be serviced) for various hunt groups. The report also indicates the length of time that the oldest call in the queue has been waiting for service.**

**NOTE:**
**The information on this report is updated every 60 seconds.**

## Command

**To display the Hunt Group Status Report, enter:**

monitor traffic hunt-groups [option]

Options: **Type the number of the hunt group that you want to begin the list. This is referred to as the starting group number. The report displays a list of 32 consecutively numbered hunt groups. There is no second page to the report; therefore, you must specify the 32 numbered blocks that you desire. The default is to begin the report with hunt group 1.**

## Screen

**Figure 3-27 shows a typical screen for the Hunt Group Status Report.**

**Each screen displays 32 hunt group fields, even though they may not all be administered. If the hunt group is not administered then its corresponding fields are blank. For each administered hunt group, the report displays the time that the first call in the queue has been waiting for service, the LCIQ field. The data on the screen is updated every minute.**

**Table 3-19 describes the data fields presented in the Hunt Group Status Report. The abbreviated labels are also identified in a key at the bottom of the screen.**

```
monitor traffic hunt-groups
Switch Name:  Cust_Switch_Name
                                   HUNT GROUP STATUS    14:27 TUE APR 3 1990
          #    S    A    Q    W    LCIQ          #    S    A    Q    W    LCIQ
          1    3    0   10    0    0            17
          2    2    0   20    0    0            18
          3    5    2   10    0    0            19
          4    1    0   40    0    0            20
          5    6    0   10    1    67           21
          6    1    0   10    0    0            22
          7    6    1   10    1    141          23
          8    4    0    0    0    0            24
          9                                     25
         10                                     26
         11                                     27
         12                                     28
         13                                     29
         14                                     30
         15                                     31
         16                                     32
 (#: Group;  S: Grp Size;  A: Active Members;  Q: Q Length;  W: Calls Waiting)
 (LCIQ: Longest Call In Queue in seconds                                     )
```

Figure 3-27. Hunt Group Status Report Screen

Table 3-19. Hunt Group Status Report

| Field | Description |
|---|---|
| # | ***Group Number.*** **A number ranging from 1 through 255 that identifies the hunt groups.** |
| 8 | **Group Size. The number of extensions assigned to the hunt group (not necessarily staffed). The range of permitted numbers is 1 through 999.** |
| A | ***Active Hunt Group Members.*** **The number of members in a group that are currently active (only) on incoming hunt group calls.**<br><br>**NOTE:**<br>**This measurement does not include individual extension type calls.** |
| Q | ***Queue Length.*** **The number of calls allowed to wait for an agent.** |
| W | ***Waiting Calls.*** **The number of calls currently waiting in the hunt group queue to be serviced by an agent.** |
| LCIQ | ***Longest Call in Queue.*** **Indicates the time in seconds that the oldest call in the hunt group queue has been waiting to be serviced.**<br><br>**Suggested Actions:**<br><br>**1. if the number of calls waiting (W) is too high (for example, the queue is full or approaching its maximum) it maybe desirable to increase the number of active members (A).**<br><br>**2. If the LCIQ field indicates that calls are having to wait in queue too long, it maybe appropriate to determine if the calls can be processed faster. Alternately, it maybe appropriate to increase the number of active members (A).** |

# Modem Pool Groups Report

**This section describes the traffic measurements report for Modem Pool Groups.**

**The Modem Pool Group Measurements Report contains measurements for monitoring the performance of the Modem Pooling feature. The system records data for the current day's peak hour, the previous day's peak hour, and the last hour. A peak hour is the hour within a 24-hour period that had the greatest command usage for the specified day.**

## Command

**To display the Modem Pool Group Measurements Report, enter:**

list measurements mode-pool [options] [print] or [schedule]

**Opf/ens: Options are yesterday-peak for yesterday's report,** today-peak **for today's report,** last-hour **for a report of the activity from the last completed measurement hour, print, or schedule.**

## Sceen

**Figure 3-28 shows a typical screen for the Modem Pool Group Measurements Report. The time and date that the report was requested are displayed to the right, above the name of the screen. Table 3-20 describes the data fields presented in the Modem Pool Group Measurements Report.**

```
list measurements modem-pool last-hour
Switch Name: Cust_Switch_Name                    Date: 1:51 pm MON SEP 16, 1991
                            MODEM POOL MEASUREMENTS
Meas  Pool Pool Pool  Total Inc   Tan   Calls   Inc   Tans  Calls Calls %
Hour  No.  Size Type  Usage Usage Usage Carried Calls Calls Blk   Ovfl  AMB
1200   1    2   integ  0     0     0     0       0     0     0     0     0
```

Figure 3-28. Modem Pool Group Measurements Report Screen

Table 3-20. Modem Pool Group Measurements Report

| Field | Description |
|---|---|
| Meas Hour | *Measurement Hour. The* starting time (using 24-hour clock) of the hour during which the data was recorded. |
| Pool No. | *Pool Number.* A number from 1 through 64 that identifies the modem proof group. The number is assigned during administration. |
| Pool Size | The number of conversion resources administered in the modem pool group (up to 16 for integrated or up to 32 for combined).<br><br>**NOTE:**<br>Refer to *DEFINITY® Communications System Generic 1 and Genefic 3-Feature Description, 555-203-201,* for a complete description of the Modem Pool feature. |
| Pool Type | The type of group, either integrated or combined (integ or comb). |
| Total Usage | The time in CCS that the members of the modem pool group are active on calls during the polling interval.<br><br>*Maximum Usage = Pool Size x* 36 CCS |
| Inc Usage | *incoming Usage.* The usage in CCS for modem pool calls (originating from incoming-or two-way trunks) that terminate on the switch.<br><br>*Outgoing Usage = Total Usage - Inc Usage* |

*Continued on next page*

Table 3-20. Modem Pool Group Measurements Report (Continued)

| Field | Description |
|---|---|
| `Calls Carried` | **The number of calls that were carried, during the pooling interval, by the identified modem pool. This includes both incoming and outgoing calls.** |
| `Inc Calls` | ***incoming Calls.* The number of calls (originating from incoming or two-way trunks) that terminate on the switch.**<br><br>***Outgoing Calls = Calls Carried - Inc Calls*** |
| `Calls Blocked` | ***The* number of calls that are blocked due to the unavailability of a conversion resource.**<br><br>Suggested Actions:<br>**1. If this field indicates that a significant number of modem pool calls are being blocked, then, as a first resort, verify that the users have their data modules set for autobaud.**<br>**2. An alternate option is to increase the** `pool size.` |
| `Cal1s Over-flow` | **The number of calls directed to a modem pool group that overflow and terminate successfully in another group.** |

## Performance Summary Report

**This section describes the traffic measurements Performance Summary Report. The Performance Summary Report summarizes the peak hour trunk blocking, ARS traffic data, Trunks Out of Service, and Trunks Not Used. The system gives a summary report for the previous day or the current day.**

3

### Command

**To display the Performance Summary Report, enter:**

list performance summary [options] [print] or [schedule]

Options: **Options are yesterday for yesterday's report or** today **for today's report.**

### screen

**Figure 3-29 shows a typical screen for the Performance Summary Report. The time and date that the report was requested are displayed to the right, following the name of the report. The report displays the information both graphically and numerically. Table 3-21 describes the data fields presented in the Performance Summary Report.**

```
list performance summary yesterday
Switch Name:  Cust_Switch_Name
SUMMARY PERFORMANCE REPORT                        Today: 4:38 pm  SAT MAY 19, 1990
    PEAK HOUR TRUNK BLOCKING                        DAILY ARS CALLS CARRIED
Grp  - %Out Blocking or % ATB - Grp       Grp    - % Calls Per Group Type -    %
No.  1 2 3 4 5 6 7 8 9 10 20 50 Blk      Type   1 10 20 30 40 50 60 80 100 Calls
54   ////////////////////////  42         co     ///////////////////          62
59   ///////////////////////   39         fx     ////////                     28
58   ///////////////////////   36         wats   //////////                    5
63   ///////////////////////   34         tie    ////////////                  5
61   ////////////////////      10         misc   ////////////////              0
        TRUNKS OUT OF SERVICE                           TRUNKS NOT USED
Grp  Trunks Out Of Service All Day        Grp  Trunks With No Calls All Day
No.  -----------------------------        No.  ------------------------------
41     9 19                               55   1
73     7                                  60   9
211    1 2 3 4 5 6 7 8 9 10               223  19 20 21 22 23
       more out of service                     more out of service
Command successfully completed
enter command:
```

Figure 3-29. Performance Summary Report Screen

Table 3-21. Performance Summary Report

| Field | Description |
|---|---|
| **PEAK Hour TRUNK BLOCK-ING** | **Lists up to a maximum of five trunk groups that have the highest percent of blocking in a measurement hour (for example, Grp No. 54 had 42 percent blocking). For incoming trunk groups, the percent of blocking is referred to as Percent All Trunks Busy (% ATB). For outgoing and two-way trunk groups, the percent blocking is referred to as % out Blocking.**<br><br>**% ATB is the percentage of time that all trunks in the trunk group were simultaneously in use during the measurement interval.**<br><br>**% out Blocking is the percentage of calls that arrive when all trunks are busy (ATB). For trunk groups with no queue, the calls not carried are those calls that could not be carried over any trunk member. For trunk groups with queues, the calls not carried are those calls that could not be carried over any trunk member and could not be queued because the queue was full (for example, the Queue Overflow calls).**<br><br>**Suggested Action: You should determine the exact reason that** a **trunk group is blocking calls. Refer to the** performance trunk-group report **(for the indicated trunk group) to determine if blocking is being caused by a high volume of calls. If it is because of calling volume alone, then consider the possibility of adding more members to the trunk group.**<br><br>**The Total calls field on the** list performance trunk-group **report, indicates the calling volume. If blocking is not because of calling volume, the reason must be because trunks are in the maintenance busy state. Determine whether maintenance personnel have been or should be alerted.** |

*Continued on next page*

Table 3-21. Performance Summary Report (Continued)

| Field | Description |
|---|---|
| DAILY ARS CALLS CARRIED | The percentage of calls carried, on a per trunk type basis by the 25 ARS patterns that are selected and being measured (with the change ars mess-selection command). The report displays the information both graphically and numerically.<br><br>This measurement is simply a summation of the Total Calls Carried on a per trunk type basis for the trunk groups listed in the measured route patterns, divided by the systemwide Total Calls Carried for all trunk types all day. The trunk group types for which ARS performance is reported in the summary report are: 00, fx, wats, tie, and misc. The tie trunk group type includes both internal and external tie, both internal and external Advanced Private Line Termination, (APLT) access, and tandem trunk group types. The term mist represents all other remaining trunk group types over which ARS calls may be routed. |
| TRUNKS OUT OF SERVICE | Lists four trunk groups with out-of-service trunks over the report interval. A list of the first ten trunks that are out of service is also given. The indication more out of service is given if there are more than four trunk groups with out of service trunks or more than 10 members are out of service in any of the groups listed.<br><br>**NOTE:**<br>This measurement is a summary of the list measurements outage-trunk report. |
| TRUNKS NOT USED | Lists four trunk groups with trunks that have not been used over the report interval (yesterday or today). A list of the first five trunks, in each of 'the identified-groups, that have not been used is also listed. The indication more out of service is given if there are more than four trunk groups with trunks that have not been used or whenever more than five members are not used.<br><br>Suggested Action: You should determine the exact reason that the trunks are not being used. Is the reason because (1) there are more trunks than actually needed, or (2) because there is a problem? If the identified trunk group has a large number of members and there are several trunks within that trunk group that receive few or zero calls, then the obvious conclusion is that there are more trunk members than needed for the trunk group. As a contrast, if there is only one trunk member identified for the trunk group and that member has zero calls, then the trunk probably is defective. |

# Port Network Reports

This section discusses the port network reports.

## Blockage Study Report

The Blockage Study Report provides information on usage and blockage for each port network as well as between switch node pairs.

There are two sub-report: One provides port network link (PNL) data and the other provides switch node link (SNL) data.

A port network link is the hardware that provides a bridge between two port networks in a direct-connect configuration or between a port network and a switch node in a center stage configuration.

A switch network link is the hardware that provides a bridge between two switch nodes.

The Blockage Study Report is designed to identify where congestion is occurring within the switching fabric and provide insight on how ports (bad) can be adjusted to achieve satisfactory service. Planning for growth additions is also simplified because the report allows quick identification and quantification of reserve switching capacity.

Both reports are available for the following time intervals:

- Last Hour
- Today's Peak
- Yesterday's Peak

The Port Network Sub-Report provides local TDM time slot usage, pegs and blockages, as well as PNL time slot usage, pegs, and blockages. The Switch Node Sub-Report provides SN to SN time-slot usage, pegs, blockages and overflow.

Of the 512 TDM time slots in each port network, usage measurements are only provided for 483 time slots employed in call processing, data links and maintenance. Usage is not reported for the remaining 29 time slots, which primarily serve system functions.

The TDM time slots are sampled at 100-second intervals, referred to as hundred-call seconds or CCS. Anytime slot in use when the sample is taken is assumed busy for the entire sampling interval and is counted as one CCS for the interval. Because there are 36 CCS in an hour and 483 reported time slots, the maximum TDM usage per port network is:

*Maximum 7DM usage= 463 x 36 CCS = 17,366 CCS*



It should be understood that 17,388 CCS represents the maximum calling volume that a single port network can support. Any calls that attempt to exceed this maximum are blocked because there are no time slots available. The blockage field (`TDM blockage`) will be incremented when that happens.

There are a maximum of 766 port network fiber time slots associated with a port network connected to another port network or between a port network and a switch node in a stage configuration. Some of those time slots maybe allocated for packet bandwidth, in which ease the number will be lower. For T1 remoting, there is a maximum of 94 fiber time slots (`PNL Time slots` field).

The PNL time slots are sampled at 100-second intervals, referred to as hundred-call seconds, or CCS. Any time slot in use when the sample is taken is assumed busy for the entire sampling interval and is counted as on CCS for the interval. Because there are 36 CCS in an hour and 766 reported time slots, the maximum PNL usage per port network is:

*Maximum PNL usage= 766 x 36 CCS = 25,576 CCS*

It should be understood that 25,576 CCS represents the maximum calling volume supported between port networks or between a port network and a switch node.

Any calls that attempt to exceed this maximum are blocked because there are no time slots available. The blockage field (`PNL Blockage`) will be incremented when that is the case.

## Command

To display the Blockage Study Report screen, enter:

list measurements blockage pn/sn last-hour/today-peak/yesterday-peak [print/schedule]

Options: **Options are print or schedule.**

Screen

**Figure *3-30* shows a typical Blockage Study Port Network Report screen. Table 3-22 describes the data fields presented in the Blockage Study Port Network Report.**

```
list measurements blockage pn last-hour
Switch Name: Cust_Switch_Name                        Date: 1:45 pm MON SEP 16, 1991
                                BLOCKAGE STUDY REPORT
        Time Division Multiplexed (TDM)        Port Network (PN) Link
PN    Hour    Usage     Peg    Blockage    Time-slots    Usage     Peg   Blockage
 1    1200    2650      5435   0            758          2125      3696   0
 3    1200    7887      1581   0            762          6265      1272   0
 4    1200    6199      8197   0            760          5862      4667   0
```

Figure 3-30. Blockage Study Port Network Report Screen

Table 3-22. Blockage Study Port Network Report

| Field | Description |
|---|---|
| PN | **The port network being measursd. Numbers can range from 1to22.** |
| TDM Usage: | **The total TDM time-slot usage, in CCS, for the PN being measured, during the measurement hour. his is calculated as follows:**<br>*TDM Usage = Sum of the allocated TDM time slots at the end of each 100 second interval(1 CCS) in a measurment hour.*<br>*TDM usage max = 483 x 36 CCS = 17,388 CCS*<br>**After each 100-second interval, a snapshot is taken of the number of TDM time-slots used on each port network** |
| TDM Peg: | **The total count of circuit switch TDM time-slot seizure attempts for the PN during the measurement hour (requests for maintenance processes not included).** |

***Continued on next page***

Table 3-22. Blockage Study Port Network Report (Continued)

| Field | Description |
|---|---|
| TDM Blockage: | The total count of TDM blockages, that is, the total number of times a TDM time-slot request is denied for the PN being measured, during the measurement hour.<br><br>Suggested Action: Generally, it is desirable to balance the traffic across port network. if the usage nears the maximum CCS, some resources should be moved to another port network |
| PNL Time-Slots : | The number of port network link time-slots available between port networks or between port networks and switch nodes. At any given time interval, this translation value is fixed. (Remember, this refers to available time slots, not measurement data.) |
| Port Network Link Usage: | The total circuit switch usage of the available PN Link(s) connecting the PN to the SN or to other PNs. For directly connected PNs in three PN systems, this is the sum of the usage for both links.<br><br>*PN LINK USAGE = Sum of the allocated PN LINK time-slots at the end of each 100 second interval (ICCS) in a measurement hour.*<br><br>*PN Link Usage Max = 766 x 36 CCS = 25,576 CCS.* |
| Port Network Link Peg: | The total count of circuit switched time-slot seizure attempts for the link(s) during the measurement hour. |
| Port Network Link Blockage: | The total count of circuit switched PN blockages, that is, the total number of times a PN link time-slot is denied during the measurement hour. This count will include calls originating or terminating on this PN. This field should be zero for all configurations that don't use T1 remoting and are smaller than 16 PNs since the stage is non-blocking in these configurations.<br><br>Suggested Action: Generally, it is desirable to balance traffic between port networks, or between port networks and switch nodes. If the usage is high for a port network, resources may need to be moved from one port network to another. |

Screen

**Figure 3-31 shows atypical Blockage Study Switch Node Report screen. Table 3-23 describes those data fields presented in the Blockage Study Switch Node Report that are different from those in the Port Network Report. Refer to Table 3-22 for data fields that are the same.**

```
list measurements blockage sn last-hour                                Page 1
Switch Name: Cust_Switch_Name                  Date: 05:45 pm THU FEB 23, 1989
                                    BLOCKAGE STUDY REPORT
CENTER STAGE
             Meas                      Switch Node (SN) Link
SN Pair      Hour      Time-slots     Usage      Peg      Blockage    Overflow
1/2          1300         766          98       49267        0            0
```

Figure 3-31. Blockage Study Switch Node Report Screen

Table 3-23. Blockage Study Switch Node Report

| Field | Description |
|---|---|
| SN Pair: | **Identifiers for the two SNL connected by the SNL being measured.** |
| Switch Node Link (SN) Time-Slots : | **The number of switch node link time-slots available between switch nodes. At any given time interval, this translation value is fixed. The SNL time slot maximum is 766; for T1 remoting, it is 94.** |
| Switch Node Link Usage: | **The total circuit switch usage of the SNL connecting the two SNs. This is the total usage on** interconnecting fibers.<br><br>**At the end of each 100-second interval, a snapshot is taken of the number of SNL time-slots used on each port network**<br><br>***Max SNL usage* = 766 X 36 CCS = 25,596.** |

***Continued on next page***

Table 3-23. Blockage Study Switch Node Report (Continued)

| Field | Description |
|---|---|
| Switch Node Link Peg : | The total count of circuit switched SNL tim-slot seizure attempts during the measurement hour between the two measured SNs. This is the total peg count on all interconnecting fibers. |
| Switch Node Link Block-age : | The total count of circuit switched SNL blockages, that is, the total number of times a call is blocked because no time-slots are available either in the most direct route or through any alternate route, during the measurement hour. |
| Switch Node Link Over-flow: | The total number of times a call had to be routed over an alternate mute successfully. This counter is incremented when a call could not be successfully routed over the most direct route and had to be routed over an alternate route successfully. This allows you to distinguish true blockage of a call from the direct route blockage.<br><br>Suggested Action: Generally, the usage between switch nodes should be equally distributed. If the usage between switch nodes is high, you may want to move resources to another switch node or add a new switch node. |

# Port Network Load Balance Report

The PN Load Balance Report is designed to show the loading on each PN and give an indication of the bad source by call type. Knowing the bad source means informed decisions can be made on how best to decrease the load or the effect of adding various kinds of ports to the PN. Growth can be accommodated with a minimum of new equipment.

The PN Load Balance Report is comprised of five sub-reports.

The Total sub-report provides an overview of time slot usage, blockage, pegs, and occupancy for time slots on the TDM bus and port network links. This report also contains a control utilization field which provides the total capacity of the processor on the EI board used as an Archangel.

The other four reports include time slot usage and pegs for the following call types:

- Intercom
- Incoming Trunk
- Outgoing Trunk
- Tandem Trunk

These reports show characteristic patterns of the load on each port network for each of the call types.

All the sub-reports are peak reports; so, data is provided for last-hour, today-peak and yesterday peak The peak for each of the four call-type reports is time coincident with the peak from the Total Report (tdm usage field).

## Command

To display the Port Network Load Balance Report screen, enter:

list measurements load balance total/intercom/incoming/ outgoing/tandem last hour/today-peak/yesterday-peak [print or schedule]

Options: The print and schedule options are available for this command.

## Screen

Figure 3-32 depicts an example of a typical screen for the Port Network Load Balance Total Today Report screen. Table 3-24 describes the data fields presented in the Port Network Load Balance Total Today Report.

```
list measurements load-balance total today                                    Page 1
Switch Name: Cust_Switch_Name                          Date: 05:45 pm THU FEB 23, 1989
                                 PORT NETWORK LOAD BALANCE STUDY REPORT
TOTAL CALLS
     Meas    Time Div. Multiplexed (TDM)          Port Network (PN) Link
PN   Hour   Usage    Peg   Blockage  Occup    Usage    Peg  Blockage   Occup  Util
 1   1500    625    1522      0         25     1103     0       3        20    30
 2   1500    625    1522      0         25     1103     0       3        20    30
 .
 .
 .
```



Figure 3-32. Port Network Load BalanceTotal Today Report Screen

Table 3-24. Port Network Load BalanceTotal Today Report

| Field | Description |
|---|---|
| PN | **Identifies the port network being measured.** |
| TX Usage | **The total TDM time-slot usage, in CCS, for the PN being follows:**<br><br>TDM usage = *Sum of the allcated* TDM Time Slots at *the and of each 100 second interval (1CCS) in a measurement hour*<br><br>*Maximum TDM Usage = 483 x 36 CCS = 17,388 CSS* |
| TDM Peg: | **The total count of circuit switch TDM time-slot seizure attempts for the PN during the measurement hour (requests for maintenance processes not included).** |

***Continued on next page***

Table 3-24. Port Network Load Balance Total Today Report (Continued)

| Field | Description |
|---|---|
| TDM Blockage: | **The total count of TDM blockages, that is, the total number of times a TDM time-slot request is denied for the PN being measured, during the measurement hour.** |
| TDM Occup | **The percent TDM Occupancy is computed as follows:**<br><br>**(TDM *Usage/Maximum TDM Usage) x 101***<br><br>**(Refer to TDM Usage on previous page)**<br><br>Suggested Action: **Generally, the bad should be distributed evenly across port networks. If the percent occupancy is out of line with the occupancy on other port networks, consideration should be given to shifting resources. Use the Intercom, Outgoing, Incoming and Tandem sub-reports to help determine which resources to shift.** |
| Port Network (PN) Link Usage: | **The total circuit switch usage of the PN Link(s).**<br><br>***PN Link usage = sum of allocated Pn to CSS link time-slots at the end of 100 second interval (1 CCS) in a measurement hour.***<br><br>***PNL Usage max = 766 x 36 CCS = 25,576 CCS*** |
| Port Network Link Block-age: | **The total count of circuit switched PN link blockages, that is, the total number of times a PN link time-slot is denied during the measurement hour. This count will include calls originating or terminating on this PN. This field should be zero for all configurations that don't use TI remoting and are smaller than 16 PNs since the center stage is non-blocking in these configurations.**<br><br>Suggested Action: **If blockages occur in the switching fabric, consider shifting resources. Use the Intercom, Outgoing, Incoming and Tandem sub-reports to determine which resources to switch.** |

*Continued on next page*

Table 3-24. Port Network Load Balance Total Today Report (Continued)

| Field | Description |
|---|---|
| Port Network Link Occup: | The percent Port Network Link Occupancy is computed as follows:<br><br>*(PN Link Usage/Total Potential Usage) x 100* |
| Port Network Link Util: | The fraction of the total capacity of the processor on the El board used as the Archangel. This value is expressed in percent, where 0% is the processor occupancy corresponding to no control measure traffic, and 100% is the processor occupancy corresponding to the maximum message traffic that can be handled and meet delay criteria. The data used to calculate this field is obtained as a traffic (counter) from the El board.<br><br>When the Archangel is idle, it will usually read about 14%. |

# Port Network Load Balance Intercom Calls Report

## Screen

**Figure 3-33 depicts an example of a typical screen for the Port Network Load Balance Intercom Calls Report screen. Table 3-25 describes the data fields presented in the Port Network Load Balance Intercom Calls Report screen.**

```
list measurements load-balance intercom last-hour
Switch Name: Cust_Switch_Name                        Date: 1:52 pm MON SEP 16, 1991
                               PORT NETWORK LOAD BALANCE STUDY REPORT
INTERCOM CALLS
      Meas       Intra PN                    Inter PN
PN    Hour     Usage     Peg               Usage     Peg
1     1200     441       490               1329      1964
3     1200     2401      34                6221      1020
4     1200     1031      520               5754      2972
```

Figure 3-33. Port Network Load Balance Intercom Calls Report Screen

Table 3-25. Port Network Load Balance Intercom Report

| Field | Description |
|---|---|
| PN | Identifies the port network being measured. |
| Mesa Hour | *Measurement Hour* |
| Intra PN Usage: | TDM time-slot usage caused by station-to-station calls on the same port network. Usage is displayed in CCS. |
| Intra PN Peg : | The count of TDM time-slot seizures caused by station-to-station calls on the same port network. |
| Inter PN Usage: | TDM time slot usage caused by station-to-station calls that originate and terminate on different port networks. Usage is displayed in CCS. |
| Inter PN Peg: | TDM time slot seizures caused by station-to-station calls that originate and terminate on different port networks. Wage is displayed in CCS. |
| | Suggested Action: Generally, load across port networks should be evenly distributed. If inter PN usage is high on a particular network you should consider shifting station resources to another port network. Although usage data is not displayed for port network to port network, analyzing the distribution of data across each port network can provide insight. |

# Port Network Load Balance Incoming Calls Report

## Screen

**Figure 3-34 depicts an example of a typical screen for the Port Network Load Balance Incoming Calls Report. Table 3-26 describes the data fields presented in the Port Network Load Balance Incoming Calls Report screen.**

```
list measurements load-balance incoming last-hour
Switch Name: Cust_Switch_Name                     Date: 1:52 pm MON SEP 16, 1991
                       PORT NETWORK LOAD BALANCE STUDY REPORT
INCOMING TRUNK
      Meas     Intra PN                   Incoming               Outgoing
PN    Hour    Usage    Peg              Usage    Peg             Usage  Peg
1     1200    0        0                1784     506             0      0
3     1200    0        0                6111     80              0      0
4     1200    6932     916              0        0               532    586
```

Figure 3-34. Port Network Load Balance Incoming Calls Report Screen

Table 3-26. Port Network Load Balance Incoming Calls Report

| Field | Description |
|---|---|
| **PN** | **Identifies the port network being measured.** |
| **Moss Hour** | ***Measured Hour*** |
| **Intra PN Usage:** | **TDM time-slot usage caused by incoming trunk calls to a station where both the trunk and station reside on the same port network. Usage is displayed in CCS.** |
| **Intra PN Peg :** | **The count of TDM time-slot seizures caused by incoming trunk calls to a station where both the trunk and station reside on the same port network. Usage is displayed in CCS.** |
| **Incoming Usage:** | **TDM time slot usage caused by incoming trunk calls where the trunk is on another port network and the station is on the measured port network. Usage is displayed in CCS.** |
| **Incoming Peg:** | **The count of TDM time slot seizures caused by incoming trunk calls where the trunk is on another port network and the station is on the measured port network.** |
| **outgoing Usage:** | **TDM time slot usage caused by incoming trunk calls where the trunk is on the measured port network and the station is on another port network. Usage is displayed in CCS.** |
| **outgoing Peg :** | **The count of TDM time slot seizures caused by incoming trunk calls where the trunk is on the measured port network and the station is on another port network.** |

# Port Network Load Balance Outgoing Calls Report

## screen

**Figure 3-35 depicts an example of a typical screen for the Port Network Load Balance Outgoing Calls Report screen. Table 3-27 describes the data fields presented in the Port Network Load Balance Outgoing Calls Report screen.**

```
list measurements load-balance outgoing last-hour
Switch Name: Cust_Switch_Name                     Date: 1:53 pm MON SEP 16, 1991
                       PORT NETWORK LOAD BALANCE STUDY REPORT
OUTGOING TRUNK
      Meas     Intra PN                  Incoming               Outgoing
PN    Hour    Usage    Peg              Usage    Peg            Usage  Peg
1     1200    318      506              1260     1160           0      0
2     1200    0        0                0        0              950    186
3     1200    52       38               72       28             404    1002
```

Figure 345. Port Network Load Balance Study Report Screen

Table 3-27. Port Network Load Balance Outgoing Calls Report

| Field | Description |
|---|---|
| PN | Identifies the port network being measured. |
| Mess Hour | *Measured Hour* |
| Intra PN Usage: | TDM time-slot usage caused by outgoing trunk calls where the station and trunk are on the same port network |
| Intra PN Peg: | The count of TDM time-slot seizures caused by outgoing trunk calls where the station and trunk are on the same port network. |
| Incoming Usage: | The TDM usage on the PN being measured resulting from outgoing trunk calls to trunks on the PN being measured, from stations on another PN. |
| Incoming Peg: | The count of TDM time-slot seizures on the PN being measured resulting from outgoing trunk calls to a trunk on the PN being measured, from a station on another PN. |
| outgoing Usage: | The TDM time slot usage on the PN being measured that results from outgoing trunk calls from stations on that PN, terminating on trunks on another PN. |
| outgoing Peg: | The count of TDM time-slot seizures on the measured PN due to outgoing trunk calls to a trunk on the measured PN from a station on another PN. |

# Port Network Load Balance Tandem calls Report

Screen

**Figure 3-38 depicts an example of a typical screen for the Port Network Load Balance Tandem Calls Report. Table 3-28 describes the data fields presented in the Port Network Load Balance Tandem Calls Report screen.**

```
list measurements load-balance tandem last-hour
Switch Name: Cust_Switch_Name                    Date: 1:53 pm MON SEP 16, 1991
                                PORT NETWORK LOAD BALANCE STUDY REPORT
TANDEM TRUNK
      Meas     Intra PN                     Incoming                  Outgoing
PN    Hour     Usage     Peg                Usage     Peg             Usage  Peg
1     1200     0         0                  0         0               0      0
3     1200     0         0                  0         0               0      0
4     1200     0         0                  0         0               0      0
```

Figure 3-36. Port Network Load Balance Tandem Calls Report Screen

Table 3-28. Port Network Load Balance Tandem Calls Report

| Field | Description |
|---|---|
| PN | Identifies the port network being measured. |
| Meas Hour | *Measured Hour* |
| Intra PN Usage: | TDM usage on the PN being measured, caused by trunk calls on the measured PN, terminating on on a trunk on that PN. |
| Intra PN peg: | Count of TDM time-slot seizures on the PN being measured caused by trunk calls from trunks on the measured PN, terminating on trunks on that PN. |
| Incoming Usage: | The TDM usage on the PN being measured resulting from trunk calls on the measured PN, from trunks on another PN. |
| Incoming Peg: | Count of TDM time-slot seizures on the PN being measured resulting from trunk calls to a trunk on the PN being measured, from trunks on another PN. |
| outgoing Usage: | TDM usage on the PN being measured that results from trunk calls from trunks on the measured Phi, terminating on trunks on another PN. |
| outgoing Peg : | The count of TDM time-slot seizures resulting from trunk calls from trunks on the measured PN, terminating on a trunk on another PN. |

# System Status Reports

**This section describes the Monitor System Status Reports which provide an overall view of how the system is performing in real-time.**

**The Monitor System Status commands generate dynamic one-page status reports that summarize the overall current condition of the system and last hour traffic status.**

**Using the Monitor System Status commands, you can generate two different status report forms. These two forms contain the following information:**

Monitor System View1. **Includes the attendant status, maintenance status, and last bouts traffic data for attendant, hunt, and trunk groups. The form also shows the date and time of day at which the report was requested.**

Monitor System View2. **Includes attendant status, maintenance status, and last hour's traffic data for attendant and trunk groups. The form also shows the date and time of the day at which the report was requested.**

**Data for attendant and maintenance status are updated every minute. Data for the traffic status is updated once every hour because traffic status is obtained from existing measurements that are collected on an hourly basis.**

**NOTE:**

**Requesting either of the system status reports should be your last request during your current logon. The screens are exited by pressing `CANCEL`, which also logs you off the system, or after a 30-minute time-out.**

## Commands

**Enter one of the following commands to display the desired Monitor System Status Report**

monitor system view1

**or**

monitor system view2

## options

**There are no options for these commands.**

Screen

**Figure 3-37 shows the Monitor System View1 report and Figure 3-38 shows the Monitor System View2 report. Table 3-29 describes the data fields presented in both reports.**

```
monitor system view1
Switch Name:  Cust_Switch_Name
                  ATTENDANT STATUS                          MAINTENANCE STATUS
                    Console no.                       # of alarms for trunks: 0
     Activated: 3                                     # of alarms for stations: 0
   Deactivated: 1 2                                   # of alarms for other res: 0
                                                      INADS has been informed ? n
                                     TRAFFIC STATUS
                                 Measurement Hour: 1800
            Trunk Group Measurement                         Hunt groups Measurement
 (4 grps with highest %time ATB)                    (4 grps with highest # of queued calls)
    Grp no:  41  12  23  221                                Grp no: 6
   Grp dir:  inc out two two                            Calls qued: 2
Calls qued:  17   9  19   12                            Calls aban: 2
 %Out blkg:   *   9  18   11                              Attendant Group Measurement
 %Time ATB:  86  79  91   93                            Calls qued: 9     Calls aban: 1
                                                               19:27 FRI MAY 18 1990
                  - press CANCEL to quit -
```

Figure 3-37. Monitor System View1 Report Screen

```
monitor system view2
Switch Name:  Cust_Switch_Name
                 ATTENDANT STATUS                  MAINTENANCE STATUS
                   Console no.               # of alarms for trunks: 0
     Activated: 3                            # of alarms for stations: 0
   Deactivated: 1 2                          # of alarms for other res: 0
                                             INADS has been informed ? n
TRAFFIC STATUS  Measurement Hour: 1800
          Trunk Group Measurement
(4 grps with highest %time ATB)
    Grp no:  41  12  23  221
   Grp dir:  inc out two two
Calls qued:  17   9  19  12
 %Out blkg:   *   9  18  11
 %Time ATB:  86  79  91   93
          Attendant Group Measurement
Calls qued: 9     Calls aban: 1
                                                     19:28 FRI MAY 18 1990
                 - press CANCEL to quit -
```

Figure 3-38. Monitor System View2 Report Screen

Table 3-29. Monitor System View1 and View2 Reports

| Field | Description |
|---|---|
| ATTENDANT STATUS | Shows the activated attendant consoles and deactivated attendant consoles. In the sample screens, console #1 and console #2 are deactivated and console #3 is activated.<br><br>**NOTE:**<br>Activated means that the agent's headset/handset is plugged in the console, and the console is not busied-out or set for Night Service.<br><br>You can use the display attendant-status command to obtain other details. |
| Maintenance Status | Shows the number of alarms (including minor and major alarms) that may indicate problems on trunks, stations, and other resources. If any alarm exists in the system or if remote maintenance (for example, the AT&T CSSO) has acknowledged an alarm, indications are shown on the report. You can use the display alarms command to determine exactly what alarms currently exist. A Y indicates that yes the alarm has been acknowledged. An N indicates no acknowledgement. |

*Continued on next page*

Table 3-29. Monitor System View1 and View2 Reports (Continued)

| Field | Description |
|---|---|
| `Traffic Status` | **View1 displays the call handling status for trunk, hunt, and attendant groups; View2 displays the call handling status for trunk and attendant groups only. The report indicate the number of queued calls and abandoned calls during the previously completed measurement interval for the identified trunk groups.**<br><br>**For the trunk group measurements, only the four trunk group numbers with the highest percentage of blocking are listed. The reports also display trunk group direction (two-way, outgoing, or incoming), the number of calls queued the percentage of outgoing blocking (for outgoing and two-way trunks), and the percentage of all trunks busy (for incoming trunks).**<br><br>**For outgoing and two-way trunk groups that are only experiencing a high number in the `%Time ATB` field, no action is required since this just indicates that the trunks are being used very efficiently. However, a bad condition is when both the `%Tlme ATB` and `%out blkg` fields are displaying high numbers, indicating that calls are arriving and being blocked because all trunks are already being used. For incoming trunk groups that are experiencing a high number in the `%Time ATB` field, then some incoming calls are probably being blocked (see Note).**<br><br>**NOTE:**<br>**The traffic status measurements are a summary of the** performance trunk-group **report.**<br><br>Suggested Actions:<br><br>1. **For outgoing and two-way trunk groups that are experiencing a high number in both the `%Time ATB` and `%out blkg` fields, you should execute the list** performance trunk-group **command and follow the suggested actions that are specified for that command.**<br>2. **For incoming trunk groups that are experiencing a high number in the `%Time ATB` field, you should execute the list** performance trunk-group **command and follow the suggested actions that are specified for that command.** |

# Tone Receiver Report

The Tone Receiver Measurements Report provides traffic data for Dual Tone Multifrequency (DTMF), purpose receivers, and Call Classifiers (CC). DTMF receivers detect touch tones, GPTD receivers detect call progress tones. CCS can function either as Call Progress Tone Receivers (CPTRs) or touch-tone receivers. However, CC are intended for call prompting applications.



**NOTE:**
Tone receivers are required to support the ARS, Terminal Dialing, Abbreviated Dialing, LND, and Call Prompting features. Refer to the *DEFINITY® Communications System Generic 1 and Generic 3i—System Description, 555-204-200* for additional details.

Each TN748 provides four DTMF receivers for touch-tone reception plus two GPTD receivers for call progress tone reception and maintenanoe testing. Each port network always requires at least one TN748 circuit pack. The number of additional TN748 circuit packs required depends upon the traffic load. Each TN744 provides eight CCS for call prompting applications.

Reports can be requested on tone receiver activity for yesterday's peak hour, today's peak hour, or the last hour. The data in this report can be used to determine if there is a need for additional Tone Detector or Tone Detector/Generator circuit packs.

## Command

To display the Tone Receiver Measurements Report screen, enter

list measurements tone-receiver last-hour/today-peak/yesterday-peak [print or schedule]

Options: **Options are** yesterday-peak **for yesterday's report,** today-peak **for** today's **report, or** last-hour **for a report of the activity from the last completed measurement hour.**

## Screen

Figures 3-39 and 3-40 depict an example of a typical screen for the Tone Receiver Measurements Report screen for a two-port network system. Table 3-30 describes the data fields presented in the Tone Receiver Measurements Report. One page of data is displayed per port network.

```
list measurements tone-receiver last-hour
Switch Name:  Cust_Switch_Name                    Date: 4:16 pm TUE OCT 17, 1990
                                    TONE RECEIVER MEASUREMENTS
                     Total  Total  Peak  Total    Peak    Total   Peak
      Hour  Type  Avail   Req    Req   Queued  Queued  Denied  Denied
      1400  DTMF    40      23     13    0         0       0       0
      1500  GPTD     6      94      7                      1       1
      1000  CC      24     0/2    0/1    0/0      0/0     0/0     0/0
                            PN     PN     Peak     Total       Peak
       PN       Type       Req    Alloc   Alloc    Off-PN     Off-PN
       1        DTMF        8      8       200       0          5
       1        GPTD        12     12      3         0          0
       1        CC          0/0    0/0     0/0       0/0        0/0
Call Classifier (CC) -TTR/CPTR
         Press CANCEL to quit   -   press NEXT PAGE to continue
```

Figum 3-39. Tone Receiver Measurements Report Screen

```
list measurements tone-receiver last-hour
Switch Name: Cust_Switch_Name                     Date: 4:17 pm TUE OCT 17, 1990
                                    TONE RECEIVER MEASUREMENTS
                     Total  Total  Peak  Total    Peak    Total   Peak
      Hour  Type  Avail   Req    Req   Queued  Queued  Denied  Denied
      1400  DTMF    40      23     13    0         0       0       0
      1500  GPTD     6      94      7                      1       1
      1000  CC      24     0/2    0/1    0/0      0/0     0/0     0/0
                            PN     PN     Peak     Total       Peak
       PN       Type       Req    Alloc   Alloc    Off-PN     Off-PN
       2        DTMF        19     19      200       0          5
       2        GPTD        12     12      3         0          0
       2        CC          0/2    0/2     0/0       0/0        0/0
Command successfully completed
enter command:
```

Figure 3-40. Tone Receiver Measurements Report Screen

Table 3-30. Tone Receiver Measurements Report

| Field | Description |
|---|---|
| `Hour` | *Measurement Hour* The starting time (using 24-hour clock) of the hour during which the greatest number of requests for tone receivers were made. |
| `Type` | *Type.* The type of tone receiver being measured<br><br>**NOTE:**<br>Each TN748 circuit pack provides four DTMF ports and two GPTD ports. Each TN748 circuit pack provides four DTMF ports (for touch-tone reception) and two GPTD ports (for call progress tone reception). The TN744 Call Classifier Circuit Pack provides eight ports for call progress tone reception or touch-tone reception. |
| `Total Avail` | *Total Available.* The system-wide total number of DTMF, GPTD or CC receivers that are available and not busied-out for maintenance. |
| `Total Req` | *Total Requests. The* system-wide total number of requests, by call processing, for DTMF, GPTD, or CC receivers during the listed hour. The total number of requests is calculated by incrementing a counter for each request. |
| `Peak Req` | *Peak Requests.* The system-wide peak number of simultaneous requests for DTMF, GPTD, or CC receivers that occurred at any one time for the listed hour. The peak (or maximum) number is calculated by incrementing a counter for each request, and decreasing the counter when the request fails or a tone receiver is released.<br><br>**NOTE:**<br>If the `Peak Req` field indicates a number higher than listed in the `Avail` field, then certain requests were either queued or denied during the peak time interval. Denied requests fail and are given the reorder tone. |

*Continued on next page*

Table 3-30. Tone Receiver Measurements Report (Continued)

| Field | Description |
|---|---|
| Total Queued | Total Queued. The system-wide total number of DTMF receivers that were queued during the listed hour. A DTMF receiver is queued when there are no DTMF receivers immediately available. There is no queuing for GPTD receivers. Where CCS are set at touch-tone receivers, queuing is as for DTMFs where they are set as CPTRs, there is no queuing.<br><br>**NOTE:**<br>If a request for a receiver is made in one port network, and it is determined that this port network cannot make any receivers available, then the request flows to the next port network. If this next port network cannot make any receivers available, and if the request is for a DTMF receiver or a CC, then an attempt to queue the request is made. If a CC is set as a touch-tone receivers, an attempt to queue the request will be made; if a CC is set as a CPTR, queue attempts will not be made. There is no dial tone for queued call attempts until atone receiver becomes available. |
| Peak Queued | *Peak Queued. The system-wide* maximum number of DTMF receivers (or CCS set as touch tone receivers) that were queued at any onetime during the listed hour.<br><br>**NOTE:**<br>The system has a maximum queue size of 4. Requests for GPTDs (or, for CCS set as CPTRs) cannot be queued, just those for DTMFs (or, for CCS set as touch tone receivers). |
| Total Denied | *Total Denied.* The system-wide total number of requests for DTMF or GPTD receivers that were denied because no receivers were available during the listed hour. For DTMF receivers (or for CCS set as touch tone receivers), this happens only after the queue is full. Those requests that overflow are given the reorder tone and counted as total denied. |

*Continued on next page*

Table 340. Tone Receiver Measurements Report (Continued)

| Field | Description |
|---|---|
| `Peak Denied` | ***Peak Denied.*** **The systemwide peak number of requests for DTMF, GPTD or CC receivers that were denied because no receivers were available during the listed hour.**<br><br>Suggested Action: **At a minimum you should increase the number of tone receivers by the number that is displayed in the `Peak Denied` field. Furthermore, you may want to consider engineering the switch as "non-blocking" for tone receivers. This would involve increasing the number of tone receivers (the `Avail` field) so that all requests receive service immediately and no requests are queued. For example, just keep the value displayed in the `Avail` field greater than that displayed in the `Peak Req` field.** |
| `PN` | ***Port Network.*** **The port network in which the circuit pack containing the type of tone receiver listed is physically located. The numbers can range from 1 to 22.** |
| `Type` | ***Type.*** **The type of tone receiver being measured: DTMF, GPTD, or CC.** |
| `PN Req` | ***Port Number Requests.*** |
| `PN Aloc` | ***Total Allocation.*** **The total number of DTMF, GPTD, or CC receivers located in the idetified port network that were allocated for use during the listed hour.** |
| `Peak Allot` | ***Peak Allcation.*** **The peak number of DTMF, GPTD, or CC receivers located in the listed port network that were used simultaneously during the listed hour.**<br><br>Suggested Action: **If the `Peak Alloc` field is smaller than the number in the `Avail` field, then there are too many tone receivers. You may consider moving one TN748 tone receiver circuit pack (in the case of CCS, it would be a TN744 receiver) to the other port network, assuming the other port network needs tone receivers.** |

***Continued on next page***

Table 3-30. Tone Receiver Measurements Report (Continued)

| Field | Description |
|---|---|
| `Total Off-PN` | ***Total Off-Port Network.*** **For the identified hour and port network, this is the total number of DTMF, GPTD, or CC receivers that were allocated for use by a port on a different port network, thus requiring Inter-pint resources.**<br>**NOTE:**<br>**With ideal conditions, this field will display the number O. However, with more practical conditions, the field will display a larger number.**<br>Suggested Actions: **Locate communities of interest within the same port network. Provide sufficient tone receivers for each port network.** |
| `Peak Off-PN` | ***Peak Off-Port Network.*** **For the identified hour and port network this is the peak number of DTMF, GPTD, or CC receivers that were simultaneously allocated for use by ports on a different port network.**<br>**NOTE:**<br>**A desirable goal is to minimize (within reason) the number displayed with this field.**<br>Suggested Actions: **Locate communities of interest within the same port network. Provide sufficient tone receivers for each port network. Perhaps you should move one TN748 circuit pack (or, if you are working with a CC, move a TN744 circuit pack) to the PN with the Off-PN counts to minimize Off-PN allocations.** |

# Traffic Summary Report



The Traffic Summary Report provides an overview of system performance. Summarized in the report are peak hour call processing and system management occupancy, peak hour blocking for tdm time slots on each port network, peak hour blocking for port network links and switch node links, and the peak hour for the tdm timeslots, port network links and switch node links combined, peak hour for the worst attendant speed of service, and the peak for today and yesterday for trunk blocking for the worst five trunk groups.

Also included are a series of traffic flags and counters that are provided for the last hour of measurement data. They include a time stamp for a major alarm, trunk group, coverage path, coverage principals, and ACA/ARS time stamps for measurement selection.

There are, as well, for last hour, totals for Trunks Out of Service, CDR high water mark and overflow and total security violations.

**NOTE:**
Data in this report is not updated on demand. It is generated every hour on the hour and can be used to identify problem areas in the system. More detailed data can be retrieved from other measurements reports, as noted in the field descriptions.

When a potential problem is identified from this report, other more detailed reports in the suspect area are required to adequately characterize the problem.

## Command

To display the Traffic Summary Report screen, enter:

list measurements summary [print or schedule]

Options: The print and schedule options are available for this command.

## Screen

Figure 3-41 shows the Traffic Summary Report screen. Table 3-31 describes the data fields for this screen.

```
list measurements summary
Switch Name: Cust_Switch_Name                    Date: 8:13 am THRU SEP 19, 1991
                         TRAFFIC SUMMARY REPORT
                   Last Hour  Today's  Yesterday's  TRAFFIC FLAGS
Meas Hour:         700        500      1300         Maj Alm: NO MAJOR ALARM
CP Occ:            0          3        5            TG:       11:08 pm SEP 16, 1991
SM Occ:            18         1        16           C Path:   11:12 pm SEP 16, 1991
Meas Hour:         700        700      2300         C Prin:   11:15 pm SEP 16, 1991
Total Block:       0          0        0            AAR/ARS: 10:01 am AUG 04, 1991
High PN Blk:       0          0        0            Total Trks Out of Srvce:  0
High SNL/PNL Blk:  0          0        0            CDR RECORD BUFFER
Meas Hour:         700        700      2300         HWM:  0     Ovfl:  0
Att. Speed:        0          0        0            Sec. Violate: 0
          FIVE TRUNK GROUPS LOWEST SPEED OF SERVICE
    -----Today's Peak-----      -----Yesterday's Peak---
    Grp No  Meas Hour  %ATB     Grp No  Meas Hour  %ATB
    30      700        100      30      2300       100
    40      700        0        40      1000       5
    39      700        0        39      2300       0
    38      700        0        38      2300       0
    37      700        0        37      2300       0
```

Figure 3-41. Traffic Summary Report Screen

Table 3-31. Traffic Summary Report

| Field | Description |
|---|---|
| CP Occ | ***Call Processing Processor Occupancy.*** **The processor occupancy due to high priority processing and dynamic call processing. The peak hour is determined by the hour with the largest call processing occupancy. Refer to then "list measurements occupancy summary" report to correlate data as well as to determine necessary actions.** |
| SM Occ: | ***System Management Processor Occupancy.*** **The processor occupancy due to system management processes. This measurement is time coincident with the peak value of call processing processor occupancy for peak measurements.** |

***Continued on next page***

**Table 3-31. Traffic Summary Report (Continued)**

| Field | Description |
|---|---|
| Att. Speed: | **Attendant *Group Speed of Service:* The average time that calls are in the attendant queue. The peak hour is the hour with the worst for speed of sercvice.**<br><br>***Att Speed*= *Total Delay for all Answered Call (in seconds) / Total Number of Calls Answered***<br><br>Suggested Action: **If the speed of answer is not acceptable for attendants working, review the attendant group and attendant positions reports ("list measurements attendant group" and "list measurements attendant positions") for suggested actions.** |
| Total Block: | ***Total Blocking.* The percent of total circuit switched time slot seizures that were blocked due to insufficient TDM or CSS time slots.**<br><br>***Total Shocking = ((TDM Blockage + SNL Blockage + PNL Blockage) X100) /(TDM Pegs + SNL Pegs + PNL Pegs)*** |
| High PN Blk : | ***Highest PN Blk.* The highest percent of TDM time slot seizure failures due to insufficient time slots for any PN. This is time coincident with Peak Total Blocking, above. It is computed as follows:**<br><br>***Highest PN Blk = (TDM Blockage x 100) / TDM Pegs*** |
| High PNL/SNL Blk: | ***Highest PNL/SNL Blk.* The highest percent of SNL and PNL seizure failures due to insufficient time slots. This measurement is only meaningful for links between Center Stage Nodes or T1 remoted PNs since connectivity to the Center Stage from any PN is non-blocking with fiber connectivity. This is time coincident with Peak Total Blocking. It is computed as follows:**<br><br>***Highest PNL/SNL Blk = ((SNL Blockage + PNL Blockage) *100)) / SNL Pegs + PNL Pegs)***<br><br>**The data from Total Block, High PN Block and High PN/SNL Block can be correlated to data on the Blockage PN and Blockage SN Reports ("list measurements blockage pn" and "list measurements blockage sn"). The peak hour is determined by the hour with the worst total (TDM, PNL and SNL blockage).** |

*Continued on next page*

Table 3-31. Traffic Summary Report (Continued)

| Field | Description |
|---|---|
| Sec. Violate: | *Total Security Violations.* The total number of security violations, both login (Log Sec Viol) and barrier code (Barrier Code Sec Viol), as recorded in the Security Violations Summary Report. Generally, this number should not be high. If it is, refer to the Security Violations Summary Detail Report ("list measurements security summary" and "list measurements security detail") for suggested actions. |
| Group: | The trunk group number. |
| Meas Hour : | *Measured Hour* |
| % ATB: | The observed blocking as determined by All Trunks Busy (ATB) for the trunk group. This shall be reported for the 5 trunk groups with the highest % ATB for today and yesterday. |
| Total Trunks Out of Service : | The total trunks out of service for the entire system as of the last hour. Refer to the Trunk Group Outage Report for more details and suggested actions ("list measurements outage trunk last hour"). |
| CDR Record Buffer HWM: | The number of times during the measurement interval that the COR Record Buffer High Water Mark was exceeded. This is a warning level reached when the number of CDR records stored on the switch is close to the maximum number of buffers allocated. |
| CDR Record Buffer Ovfl: | The number of times during the last hour that the CDR Record Buffer Overflowed invoking the administration selectable overflow response. Special handling procedures occur when all CDR buffers are filled. To prevent undesired loss of data, options will be put in effect to redirect calls generating CDR records to the attendant or to give those calls intercept treatment.<br><br>Suggested Actions: Both the above conditions indicate that the CDR primary link is down and that maintenance tests should be done to check that the link doesn't have hardware problems ("test cdr-link primary"). |

*Continued on next page*

Table 3-31. Traffic Summary Report (Continued)

| Field | Description |
|---|---|
| Maj Alarm: | **The time stamp of the last major alarm that was active when the report was generated for the last hour.**<br><br>Suggested Action: **If measurement data on reports seems inconsistent, further study of alarms may point to a potential problem ("display alarms").** |
| TG : | **Time stamp that indicates when the Trunk Groups Measurement Selection Administration Form was updated. This time stamp is retrieved when the report is generated for the last hour.** |
| C Path: | **Time stamp that indicates when the Coverage Measurement Selection Administration Form was updated. This time stamp is retrieved when the report is generated for the last hour.** |
| C Prin: | **Time stamp that indicates when the Principal Measurement Selection Administration Form was updated. This time stamp is retrieved when the report is generated for the last hour.** |
| AAR/ARS : | **Time stamp that indicates when the Measurement AAR/ARS Selection Administration Form was updated. This time stamp is retrieved when the report is generated for the last hour. The time at which the identification of AAR/ARS Patterns to be studied was last changed.** |

# Trunk Groups

**This section describes the traffic, outage, performance, status and call-by-call reports for Trunk Groups, and describes the validation and analysis of the data provided in the reports.**

# Trunk Group Summary Report

**The Trunk Group Summary Report gives traffic measurements for all trunk groups except for Personal Central Office Line Groups. By using this report, you can determine the trunk group total usage (in CCS), the total number of calls, trunk blockage, and other measurement data.**

## Command

**To display the Trunk Group Summary report, enter:**

list measurements trunk-group summary [option] [print or schedule]l

Options: **Options are** yesterday-peak **for a report of yesterday's peak trunk activity,** today-peak **for a report of today's peak trunk activity, or** last-hour **for a report of the trunk activity of the most recently completed hour. A peak hour is the hour within a 24-hour period that had the greatest usage for the specified 24-hour period.**

## Screen

**Figure 3-42 shows atypical screen for the Trunk Group Summary Report. Table 3-32 describes the data fields presented in the Trunk Group Summary Report.**

```
list measurements trunk-group summary last-hour
Switch Name: Cust_Switch_Name                      Date: 1:58 pm MON SEP 16, 1991
                                 TRUNK GROUP SUMMARY REPORT
                           Peak Hour For All Trunk Groups: 1000
Grp Grp  Grp  Grp Meas Total Total Inc.  Grp  Que  Calls Que Que Out   %  %Out
No. Size Type Dir Hour Usage Seize Seize Ovfl Size Qued  Ovf Abd Serv ATB Blk
20  1    did  inc 1200 0     0     0     0    0    0     0   0   0    0
30  1    tie  two 1200 36    0     0     0    0    0     0   0   0    100 0
37  22   tand two 1200 598   179   0     0    0    0     0   0   0    0   0
38  23   isdn two 1200 171   654   0     0    0    0     0   0   0    0   0
39  22   isdn two 1200 270   762   762   0    0    0     0   0   0    0   0
40  5    co   two 1200 61    32    0     6    0    0     0   0   0    6   15
```

Figure 3-42. Trunk Summary Report Screen

Table 3-32. Trunk Group Summary Report

| Field | Description |
|---|---|
| Peak Hour for All Trunk Groups | For the yesterday-peak and today-peak options, it is the hour during the specified day that has the largest total usage, when summed over all trunk groups. For the last-hour option, it is the most recently completed measurement hour.<br><br>Peak hour and busy hour are synonymous. With conventional traffic theory data analysis, there are two methods for determining the peak hour. One is the fixed peak hour, meaning that hourly usage values are averaged across days for each hour of the day. The other is the bouncing peak hour, meaning that the highest usage is selected for each day without regard to the average across days. For the bouncing peak hour the highest load on a given day mayor may not occur during the fixed busy hour. These traffic reports and accompanying trunk group data worksheet only use the bouncing peak hour method. |
| GrP No. | *Group Number.* A number that identifies each trunk group associated with the displayed data. The range of possible trunk group numbers is 1 through 666.<br><br>Group numbers are displayed in numerical order, beginning with the lowest administered number and continuing to the highest administered number. |
| Grp size | *Group Size.* The number of administered trunks in the trunk group. The range of possible numbers is one through 666. |

*Continued on next page*

Table 3-32. Trunk Group Summary Report (Continued)

| Field | Description |
|---|---|
| **Grp Typo** | ***Group Type.*** **The type of trunk in the trunk group. The system monitors/measures the following trunk types:**<br><br>**Access Tie Trunk (Access)**<br>**Advanced Private Line Termination (aplt)**<br>**Central Office (co) or Public Network Service**<br>**Customer Provided Equipment (cpe)**<br>**Direct Inward Dialing (did)**<br>**Digital Multiplexed interface Bit Oriented Signaling (dm-bos)**<br>**Foreign Exchange (fx)**<br>**Integrated Services Digital Network (isdn-pri)**<br>**Release Link Trunk (rlt)**<br>**Tandem (tan)**<br>**Tie Trunk (tie)**<br>**Wide Area Telecommunications Service (wats)** |
| **Grp Dir** | ***Trunk Group Direction.*** **identifies whether the trunk group is incoming only (inc), outgoing only (out), or two-way (two).** |
| **Meas Hour** | ***Measurement Hour*** **The hour (using 24-hour dock) in which the measurements are taken. For the last-hour report, it is the last hour of measurement (each trunk group's measurement hour is identical; but not necessarily the same as the indicated peak hour for the day). For the** today-peak **report, the measurement hour is the peak hour for each trunk group thus far today (each trunk group's measurement hour could be different). For the yesterday-peak report, the measurement hour is the peak hour for each trunk group yesterday (each trunk group's measurement hour can be different).** |

*Continued on next page*

Table 3-32. Trunk Group Summary Report (Continued)

| Field | Description |
|---|---|
| Total Usage | Total usage (in CCS) for all trunks in the trunk group. Represents the total time the trunks are busy (with calls) during the one-hour measurement period. |
| Total Seize. | *Total Seizures.* The number of times a trunk in the trunk group was seized. The call may or ma not have been completed. The Average Holding Tree, or duration of a call, can be determined as follows: $\textit{Average Holding Time (in seconds)} = \left( \frac{\textit{Total Usage CCS}}{\textit{Total Seizures}} \right) \times 100 \textit{ secs}$ |
| Inc. Seize | *booming Seizures.* The total number of times a trunk in the trunk group was seized in order to receive an incoming call. The call mayor may not have been completed. These calls may be incoming from a one-way trunk group or the incoming portion of a two-way trunk group. The number of Outgoing Seizures can be calculated as follows: *Out Seize = Total Seize - In Seize* |
| Grp Ovfl | *Group Overflow.* The number of outgoing calls that are attempted when all trunks are busy. It does not include unauthorized calls that are denied service on the trunk group (due to restrictions). Calls that overflow to the next trunk group in the routing pattern via the ARS or Automatic Alternate Routing (AAR) feature also show up in this field. It should be understood that on a per-trunk group basis the Group overflow calls are actually blocked calls. A blocked call is a call that is attempted when no trunks are available. A blocked call will queue (provided that a queue is administered) or it is denied if no queue exists. For a trunk group with a queue administered, the group overflow field is calculated as follows: *Group Overflow = Calls Queued + Queue Overflow* |

*Continued* on next *page*

Table 3-32. Trunk Group Summary Report (Continued)

| Field | Description |
|---|---|
| `Que Size` | Trunk Group *Group Queue Size.* A number (zero to 100) that identifies the number of slots assigned to the trunk group queue. This number represents how many calls may be held in queue by the trunk group. If O is displayed, then no queue is administered. Hence, the other queue measurements will also be 0. Generally, the queue size should be larger than the trunk group size; but, typically not more than three times as large as the trunk group size. |
| `Calls Qued` | Calls Queued. The total number of calls that entered the trunk group queue after finding all trunks busy. |
| `Que Ovf` | *Queue Overflow. The* total number of calls that were not queued because the queue was full. These calls receive a busy signal.<br><br>Suggested Actions: Generally, this field will indicate the number O. If this field indicates a high number, then:<br><br>a. The queue size maybe too small, or<br><br>b. More trunks may need to be added to reduce the number of calls queuing. |
| `Que Abd` | Queue Abandoned. The number of calls that were removed from the queue in one of the following manners:<br><br>■ By the system because they have been in the queue for more than 30 minutes<br><br>■ By the user (for example, dialing the cancel cafe).<br><br>Suggested Action: If the last-hour measurement report just happens to also be the peak-hour, then the data may be used to make a decision regarding whether the queue size is proper. Typically, this field will indicate a small number. However, a large number will generally indicate that the queue size is too large and that people are abandoning because they have remained in queue for a long holding time and give up. |

*Continued on next page*

Table 3-32. Trunk Group Summary Report (Continued)

| Field | Description |
|---|---|
| `Out Serv` | ***Out of Service.*** **The number of trunks in the trunk group that are out of service (listed as maintenance busy) at the time data is collected. An individual trunk may be taken out of service (a) by the switch whenever an excessive number of errors occur, or (b) by maintenance personnel to run diagnostic tests.**<br><br>Suggested Action: **If the trunks were removed from service by the switch, then the appropriate maintenance personnel should be notified. The objective is to keep all members of a trunk group "in service." Generally, you should not make adjustments to the trunk group because of "Out of Service" trunks, but should get those trunks returned to service.**<br><br>**Refer to the Trunk Outage Measurements Report for specific details.** |
| `% ATB` | **Percentage all trunks *busy.* The percentage of time that all trunks in the trunk group were simultaneously in use during the measurement interval.**<br><br>**NOTE:**<br>**In use means that the trunks were busy—either sewing calls, or because they were busied-out by maintenance.**<br><br>Suggested Actions:<br><br>**1. If the group direction is outgoing or two-way, then a high number in the `% ATB` fieid and nothing in the `Grp Ovfl` or `Que Ovf` would indicate that everything is functioning. However, a more typical scenario would be a high number in this field and also a high number in the `Grp ovfl` field. This would indicate a possible problem that necessitates further analysis. If this is "Preference 1" of the ARS routing pattern, then overflow is just to the second choice trunk group, and the number in the `Grp ovfl` field is of no great significance. Otherwise, the obvious choice is to add more trunks to the trunk group.**<br><br>**2. If the group direction is incoming, then a high number in this field is bad. It indicates that some incoming calls are probably being blocked. Generally, you will want to add more trunks, thus lowering the `% ATB` and decreasing the number of calls that are being blocked.** |

*Continued on next page*

Table 3-32. Trunk Group Summary Report (Continued)

| Field | Description |
|---|---|
| `% Out Blk` | *Percentage Outgoing Blocking. The percentage* of offered calls that are not carried on the trunk group. It does not include unauthorized calls that are denied service on the trunk group (due to restrictions) or calls that are carried on the trunk group but do not successfully complete at the far end (that is, where there is no answer).<br><br>For trunk groups without a queue, the calls not carried are those calls that arrive when all trunks are busy. For this scenario the Percentage Outgoing Blocking is calculated as follows:<br><br>The number of Outgoing Seizures is calculated as follows:<br><br>*Outgoing Seizures = Total Seizures - Incoming Seizures*<br><br>$\%\ OutBlk = \left(\frac{Group\ Overflow}{Overflow + OutgoingSeizures}\right) \times 100$<br><br>Simiarly, the equation for calculating Outgoing Calls Offered is as fol- :<br><br>*OutgoingCalls Offered = Group Overflow + OutgoingSeizures*<br><br>For trunk groups with a queue, the calls not carried are those calls that arrive when all trunks are busy and the queue is full (Queue Overflow) and calls that are removed from queue before being carried (Queue Abandoned). For this scenario, the Percentage Outgoing Blocking is calculated as follows:<br><br>$\%\ OutBlk = \left(\frac{Queue\ Overflow + QueAbd}{QueOverfl + QueAbd + OutSeiz}\right) \times 100$<br><br>Similarly, the equation for calculating Calls Offered is as follows:<br><br>*Outgoing Calls Offered = Que Ovf + Que Abd + Outgoing Seizures*<br><br>Suggested Actions:<br><br>1. You can increase the length of the queue rather than adding more trunks. Subsequently, you should monitor the `Que Abd` field to insure that it stays within reasonable limits.<br><br>2. If conditions are such that Step 1 is not appropriate, then you may find it necessary to add more trunks. |

# Trunk Group Hourly Report

The Trunk Group Hourly Report provides data necessary to validate the information in the Trunk Group Summary Report and to size the trunk groups. A separate report is generated for each trunk group. A maximum of 75 trunk groups can be studied hourly at the same time.

**NOTE:**
In order to display these hourly reports, you must first complete the Trunk Group Measurement Selection Form. The Trunk Group Measurement Selection Form is explained immediately after this section about the Trunk Group Hourly Report.

3

## Command

To display the Trunk Group Hourly Report, enter: list meaaurements trunk-group hourly trunk group no.> [print/schedule]

Options: The print and schedule options are available for this command.

## Screen

Figure 3-43 shows atypical screen for the Trunk Group Hourly Report. Tables 3-33 and 3-34 describe the data fields presented in the Trunk Group Hourly Report. The report contains two sections: a header section that provides report ending time and trunk group administrative information; and a data section that provides the measurement data for 24 hours.

```
list measurements trunk-group hourly 40
Switch Name: Cust_Switch_Name                         Date: 1:58 pm MON SEP 16, 1991
                         TRUNK GROUP HOURLY REPORT
Grp No: 40      Grp Size: 5      Grp Type: co      Grp Dir: two   Que Size: 0
 Meas  Total  Maint  Total   Inc.   Tandem  Grp    Call Que   Que   Out   %   %Out
 Hour  Usage  Usage  Seize   Seize  Seize   Ovfl   Qued Ovf   Abd   Sev   ATB Blk
 1200  61     0      32      0      0       6      0    0     0     0     6   15
 1100  62     0      33      0      0       0      0    0     0     0     0   0
 1000  69     0      63      0      0       4      0    0     0     0     3   5
 900   26     0      0       0      0       0      0    0     0     0     0   0
 800   1      1      4       0      0       0      0    0     0     0     0   0
```

Figure 3-43. Trunk Group Hourly Report Screen

Table 3-33. Trunk Group Hourly Report (Header)

| Field | **Description** |
|---|---|
| Grp No.: | *GroupNumber.* A number that identifies the trunk group assiciated with the displayed data. The range of possible numbers is 1 through 666. |
| Grp Size: | *GroupSize.* Number of trunks in the trunk group. |
| Grp Type: | *GroupType.* All trunk group types except PCOL trunk groups. |
| Grp Dir: | *GroupDirection.* Incoming, outgoing, or two-way. |
| Quo size: | *Queue Size.* The size of the trunk group queue. If there is no queue, the size is zero and the other queue measurements are irrelevant. |

Table 3-34. Trunk Group Hourly Report (Data)

| Field | Description |
|---|---|
| Total Usage: | The total time trunks in the trunk group are unavailable to carry a new call. It includes time the trunks are busy on calls, false starts, don't answers, maintenance busy, or any other reason the trunk is unavailable. Not included are calls denied service on the trunk group for authorization reasons or because of queue overflow. |
| Maint Usage : | The total usage of trunks in this trunk group for Maintenance Busy or any other non-call situation where trunks are not available to carry a call. |
| Total Seize: | The total number of seizures on the trunk group. |
| Inc. Seize: | The number of incoming seizures on the trunk group. |
| Tandem Seize: | The number of seizures that were connected to another trunk as tandem seizure. |
| Grp Ovfl: | The outgoing call offered to the trunk that are not carried. These are the calls that arrive when all trunks in the group are busy and are not queued on the trunk group. It does not include the calls that are denied service on the trunk group because of authorization reasons or because of queue overflow. |
| Calls Qued: | *Calls Queued. The* calls that enter the trunk group queue. This can happen automatically for analog terminal users or at the request of the caller for other terminal types. |
| Que Ovf | Queue Overflow. The number of calls that arrive when all slots in the Trunk Group Queue are occupied. |
| Que Abd: | *Queue Abandoned.* Calls that are removed from the queue either by the system because they have been in the queue for the maximum allowed time (currently fixed at thirty minutes), or forced by users when they cancel the auto-call back, set earlier to put the call in the queue. |

*Continued on next page*

Table 3-34. Trunk Group Hourly Report (Data) (Continued)

| Field | Description |
|---|---|
| **out Serv** | ***Out of Service.*** **The number of trunks in the trunk group that were out of service during the measurement hour.** |
| **% ATB** | ***Percent All Trunks Busy.*** **The percentage of time during the measurment interval that all trunks in the group are unavailable to carry a new call (All Trunks Busy).** |
| **%Out Blk** | **The percent of the outgoing seizures, including tandem seizures, offered to that trunk group that are not carried on that trunk group. The value shall be calulated as follows:**<br>***% Out Blk = {Grp Ovfl/Total Seize - Inc seize]} x 100*** |

# Trunk Group Measurement Selection Form

**The Trunk Group Measurement Selection Form is used at administration time to identify the trunks and trunk-groups in the Trunk Group Hourly Reports. It permits the user to administer which trunk groups are to be reported for the hourly report. (All administered trunks are studied for the summary report.) A maxmum of 75 trunk groups can be studied hourly. If no selections are made, no trunk groups will be studied hourly.**



## Command

**To display the Trunk Group Measurement Selection Form, enter:**

change/display meas-selection trunk-group [print or schedule]

Options: **The print and schedule options are available for this command.**

## Screen

**Figure 3-44 shows atypical screen for the Trunk Group Measurement Selection Form. Table 3-35 describes the data fields presented in the Trunk Group Measurement Selection Form.**

```
display meas-selection trunk-group
Switch Name:  Cust_Switch_Name
                         TRUNK GROUP MEASUREMENT SELECTION
                                 Trunk Group Numbers
 1:   78        16:  15        31:    96        46:  333        61:  580
 2:   80        17:  16        32:    97        47:  444        62:  590
 3:  666        18:  17        33:    98        48:  555        63:  591
 4:    1        19:  18        34:   100        49:  101        64:  592
 5:    2        20:  81        35:   120        50:  102        65:  10
 6:    3        21:  82        36:   200        51:  103        66:  99
 7:    4        22:  83        37:    22        52:  104        67:  357
 8    5         23:  88        38:   234        53:  201        68:  467
 9:    6        24:  89        39:   245        54:  203        69:  665
10:    7        25:  90        40:   246        55:  205        70:  664
11:    9        26:  91        41:   247        56:  207        71:  663
12:   11        27:  92        42:   250        57:  209        72:  662
13:   12        28:  93        43:   255        58:  550        73:  661
14:   13        29:  94        44:   256        59:  560        74:  599
15:   14        30:  95        45:   257        60:  570        75:  588
```

Figure 3-44. Trunk Group Measurement Selection Screen

Table 3-35. Trunk Group Measurement Selection Form

| Field | Description |
|---|---|
| Trunk Group Numbers | Defines the trunk group(s) to be studied hourly. |

# Trunk Group Performance Report

**The Trunk Group Performance Report gives a graphical and numerical display of the peak hour blocking for each trunk group. You can display the Trunk Group Performance Report for the previous day or the current day (yesterday or today).**



## Command

**To display the Trunk Group Performance Report, enter:**

list performance trunk-group [option] [print] or [schedule]

Options: **The options available for this command are: yesterday for a report of yesterday's trunk activity,** today **for a report of today's activity,** print **or schedule.**

## Screen

**Figure 3-45 shows atypical screen for the Trunk Group Performance Report. Table 3-36 describes the data fields presented in the Trunk Group Performance Report.**

```
list performance trunk-group yesterday
Switch Name:  Cust_Switch_Name
Trunk Group Performance                             Today: 4:28 pm SAT MAY 19, 1990
             HIGHEST HOURLY TRUNK GROUP BLOCKING
Grp Grp  Grp Grp   --% Outgoing Blocking or % ATB-- %Out  %Time Meas  Total
No. Type Dir Size  1 2 3 4 5 6 7 8 9 10 20 30 40 50 Blkg  ATB   Hour  Calls
1   fx   in  6     /////////////////                *     9     1200  876
2   wats in  5     //////////////////////////       *     30    1400  94
3   tie  two 14    /////////////                    7     36    1300  312
5   ddd  two 10    ///////////////////////          20    99    1300  542
12  co   two 18    //////////////////               9     96    1400  614
23  tie  two 7     /////////////////////            18    81    1400  359
41  tie  two 8     ///////////////////////          26    91    1300  411
221 tie  two 5     /////////////////////            11    77    1300  109
Command successfully completed
enter command:
```

Figure 3-45. Trunk Group Performance Report Screen

Table 3-36. Trunk Group Performance Report

| Field | Description |
|---|---|
| `Grp No.` | *Group Number.* A number that identifies the trunk group associated with the displayed data. The range of possible numbers is 1 through 666. |
| `Grp Type` | *Group Type.* The type of trunk associated with the accumulated data. The system monitors the following trunk types (see the *DEFINITY® Communications System Generic 1 and Generic 3—Feature Description, 555-203-201):*<br>■ *Access* (`Access`)<br>■ Advanced Private Line Termination (`aplt`)<br>■ Central Office (`co`) or Public Network Service<br>■ Customer Provided Equipment (`cpe`)<br>■ Direct Inward Dialing (`did`)<br>■ Digital Multiplexed interface Bit Oriented Signaling (`dmi-bos`)<br>■ Foreign Exchange (`fx`)<br>■ integrated Services Digital Network (`isdn-pri`)<br>■ Release Link Trunk (`rlt`)<br>■ Tandem (`tandem`)<br>■ Tie Trunk (`tie`)<br>■ Wide Area Telecommunications Service (`wats`) |
| `Grp Dir` | *Trunk Group Direction.* identifies whether the trunk group is incoming only (`inc`), outgoing only (`Out`), or two-way (`two`). |
| `Grp size` | *Group Size.* The number of trunks in the trunk group. The range of possible numbers is 1 through 666. |
| `%Out Blkg` | *Percentage Outgoing Blocking.* The percentage of calls that arrive when all trunks are busy. |

*Continued on next page*

Table 3-36. Trunk Group Performance Report (Continued)

| Field | Description |
|---|---|
| % outgoing Blocking or % ATB | ***Percent Outgoing Blocking or Percent All Trunks Busy.*** **A graphical representation which is equivalent to the numerical value of calls offered but not carried. For two-way and outgoing trunk groups, peak hour blocking is the largest % Outgoing Blocking. For incoming trunks, peak hour is the largest % ATB. Since % Outgoing Blocking is meaningless for incoming trunks, it is displayed as * in that column. For trunk groups without a queue, calls not carried are those calls that arrive when all trunks are busy. For trunk groups with a queue, calls not carried are calls that arrive when all trunks are busy and the queue is full (Queue overflow) and calls that are removed from queue before being carried (Queue Abandoned).**<br><br>Suggested Actions: **If a trunk group has a higher percent of blocking than desired, you should determine the exact reason that the trunk group is blocking calls.**<br><br>**1. The** `Total CallS` **field indicates the calling volume. If excessive blocking is because of calling volume alone, then consider the possibility of adding more members to the trunk group.**<br><br>**2. If excessive blocking is not because of calling volume, the reason must be because trunks are in the maintenance busy state. You can use the Trunk Outage Report (which is described next) to identify those trunks that are determined to be out of service. Furthermore, and as required, you can use the ACA feature to monitor any trunk group that is still experiencing unexplained excessive blockage.**<br><br>**3. For identified problems, determine whether maintenance has been or should be alerted.** |
| %Time ATE | ***Percent of Time All Trunks Busy. The percent*** **of time that all trunks in the trunk group were simultaneously in use during the measurement interval.**<br><br>**NOTE:**<br>**In use means that the trunks were busy-either sewing calls, or because they were busied-out by maintenance.** |
| Meas Hour | ***Measurment Hour. The*** **starting time (using 24-hour clock) of the hour during which the data was recorded.** |
| Total Calls | **The total number of calls (seizures) for the trunk group during the peak hour of blocking.** |

# Trunk Outage Measurements Report

**The Trunk Outage Measurements Report lists up to a maximum of five trunks (in each trunk group) that were out of service when sampled. The number of times the trunks were out of service when sampled is also given. The trunk outage data is kept for the current day, the previous day, and the last hour.**

## Command

**To display the Trunk Outage Measurements Report, enter:**

list measurements outage-trunk [option] [print] or [schedule]

Options: **The options available for this command are: yesterday for a report of yesterday's trunk activity, today for a report of today's trunk activity,** last-hour **for a report of the trunk activity of the most recently completed hour,** print **or** schedule.

## Sceen

**The Trunk Outage Measurements Report screen is shown in Figure 3-46. Table 3-37 describes the data fields presented in the Trunk Outage Measurements Report.**

```
  list measurements outage-trunk yesterday
  Switch Name: Cust_Switch_Name
  Trunk Outage Report                  Today:  4:01 pm SAT MAY 19, 1990
                     TRUNK OUT OF SERVICE REPORT
       (trunks sampled for "out of service" condition once each hour)
        Grp      Grp     Grp     Grp     Grp     #Sampled
        No.      Type    Dir     Size    Mbr#    Outages
        1        co      two     20       2       1
        1        co      two     20       4       8
        1        co      two     20       5       3
        1        co      two     20       6       2
        4        wats    out     10       2       5
        4        wats    out     10       4       3
        4        wats    out     10       9       2
        4        wats    out     10      10       1
Command successfully completed
enter command:
```

Figure 3-46. Trunk Outage Measurements Report Screen

Table 3-37. Trunk Outage Measurements Report

| Field | Description |
|---|---|
| `GrP No.` | *Group Number.* A number that identifies each trunk group associated with the displayed data. The range of possible numbers is 1 through 666. |
| `Grp Type` | *Group Tue.* The type of trunk associated with the accumulated data. The system monitors the following trunk types (see DEFINITY® Com*munications System Generic 1 and Generic 3—Feature Description, 555-203-207* manual):<br>■ Access (`Access`)<br>■ Advanced Private Line Termination (`aplt`)<br>■ Central Office (`co`) or Public Network Service<br>■ Customer Provided Equipment (`cpe`)<br>■ Digital Multiplexed Interface Bit Oriented Signaling (`dmi - bos`)<br>■ Direct Inward Dialing (`did`)<br>■ Foreign Exchange (`fx`)<br>■ integrated Services Digital Network (`isdn-pri`)<br>■ Release Link Trunk (`rlt`)<br>■ Tandem (`tandem`)<br>■ Tie Trunk (`tie`)<br>■ Wide Area Telecommunications Service (`wats`) |
| `Grp Dir` | *Group Direction.* Identifies whether the trunk group is incoming only (`inc`), outgoing only (`out`), or two-way (`two`). |
| `Grp size` | *Group Size.* The number of trunks in the trunk group. The range of possible numbers is 1 through 666. |
| `Grp Mbr #` | *Group Member Number.* The number that identifies a specific trunk member (in the group) that is out of service. |

*Continued on next page*

Table 3-37. Trunk Outage Measurements Report (Continued)

| Field | Description |
|---|---|
| #Sampled Outages | *Number of Sampled Outages. The* number of times the group member is sampled as out of service over the period covered by the report (yesterday, today, or last hour). Yesterday includes the 24 hours beginning at midnight and ending at midnight. Today includes those hours from midnight to the most recently completed hour. Last hour only includes the most recently completed hour.<br><br>**NOTE:**<br>If there are no outages, then no data is displayed.<br><br>Suggested Actions:<br>1. The sampling period is once per hour. Therefore, if the report covers several hours (for example, the yesterday or today report) but the column only indicates a small number of outages, then the trunk member may be providing intermittent service. You should use the Facility Test Calls feature to determine whether a specific trunk member is functioning.<br>2. If a trunk is just suspected of causing problems, you should use the ACA feature to monitor the particular trunk group.<br>3. if a trunk member is totally out of service, then (depending on local arrangements) you may choose to refer the problem to maintenance personnel. |

# Trunk Group Status Report

The Trunk Group Status Report gives a current indication of the bad on various trunk groups in terms of the number of calls waiting to be serviced.

For each trunk group, the Status Report displays the number of calls in the queue waiting to be serviced. For comparative analysis, the trunk members in the group that are active on calls are also displayed. With this data, it is possible to rearrange the members in the groups to provide load balancing. For example, if one group shows a higher number of calls waiting in the queue and the size of the group is too small, more members can be added to that group.



## Command

To display the Trunk Group Status Report, enter:

monitor traffic trunk-groups [option]

Options: Typing the command without an option will produce a display of the first 60 administered trunk groups (the possible range is 1 through 666). To display higher numbered trunk groups, type the number of the first group of the 60 trunk groups to display the report in place of [option]. Only those trunk groups that are administered are shown on the report.

## Screen

Figure 3-47 shows a typical Trunk Group Status Report. If the system has less than 60 groups administered, then some of the right-hand columns will be displayed with blanks. The date and time at which the report was requested are displayed to the right of the screen title. Table 3-36 describes the data fields presented in the Trunk Group Status Report.

The data on the screen is updated every minute. If the values of any of the fields for the given trunk group are changed, all the fields for that trunk group are updated.

```
monitor traffic trunk-groups
Switch Name:  Cust_Switch_Name
                                TRUNK GROUP STATUS      19:03 SAT MAY 19 1990
 #    S   A   Q   W     #   S   A   Q   W    #   S  A  Q  W    #  S  A  Q  W
 1   20  10   0   0    16  14   3   0   0   59   9  1  0  0
 2   21  21  20  10    23   4   6   8   0   60   8  1 18  0
 3   31  12   0   0    25   5   0   0   0   61   2  0  0  0
 4   10   5  10   8    27  12   2  18   0   62   4  1  8  0
 5    9   5  10   0    30   7   2  14   0   63   6  1 15  0
 6   10   8  10   0    41   5   1   0   0   73   6  0  8  0
 7    4   1   8   0    42  12   4  20   0  211  22  2  0  0
 8    4   4   8   2    43   6   3   0   0
 9    5   2  10   0    44  16   6  18   0
10    7   3  14   0    45   8   0   0   0
11    6   2  12   0    46   8   3  18   0
12    5   2  10   0    54   9   2   0   0
13    4   1   0   0    55   6   6  12   3
14    5   4   8   0    57   8   4  10   0
15    5   3   9   0    58   4   1   0   0
 (#: Group; S: Grp Size; A: Active Members; Q: Q length; W: Call Waiting.)
```

Figure 3-47. Trunk Group Status Report Screen

Table 3-38. Trunk Group Status Report

| Field | Description |
|---|---|
| # | ***Group Number.*** **A number from 1 to 666 that identifies each trunk group.** |
| 8 | ***Group Size.*** **The number of trunks that are administered for tie trunk group. The range of possible numbers is 1through 666** |
| A | **Active *Group Members.* The number of trunk members in the group that are active on a call. Busied-out trunks are not active.** |
| Q | ***Queue Length.*** **The length of the queue administered for the group.** |
| W | ***Waiting Calls.*** **The number of calls waiting in the group queue.** |

## Data Analysis Guidelines

The following guidelines are intended to show an easy and fast method of determining whether the collected data is invalid or questionable. These guidelines represent the least that you should do for validation. You should perform additional validation as necessary.



You can use the list performance trunk-group report to obtain an overall indication of those trunk groups that maybe providing poor service. The five trunk groups with the highest percentage of blocking are listed in the list summary performance report. However, this report (summary) has the following limitations:

- The Group Blocking shown on this report is the percentage of blocking for outgoing and two-way trunk groups. For incoming trunk groups, the Group Blocking value is the percentage of all trunks busy (ATB). A high value for either % ATB or the % Out Blocking is an indication of possible traffic bad problems.
- A two-way trunk group with undesirable incoming blocking will not show any problems on this reportt, since only outgoing blocking is measured on two-way trunks.

You can use data from the Trunk Group Measurements Report for a more accurate estimate of service levels on incoming and two-way trunk groups. To validate the Trunk Group Measurements Report, verify that the following data is in order:

- Total Usage in CCS should not exceed 36 times group size. For example, with two trunks, the total usage measured should not exceed 2 x 36 = 72 CCS.
- On incoming trunks, total seizures should be equal to total incoming seizures.
- Incoming trunk groups should have a queue length of zero.
- The number of incoming calls should never be greater than the total number of calls carried by all trunks in the group.
- For incoming trunk groups the column `% ATB` should never indicate a value higher than 100.
- For outgoing trunk groups the `% out Blk` should never indicate a value higher than 100.
- Outgoing trunk groups should indicate zero as their number of incoming calls.
- Out-of-service trunks should never be greater than group size.
- For trunk groups that have a queue, the two fields (Calls Queued and Queue Overflow) should total the number displayed in the Group Overflow field.
- The Queue Overflow field is incremented whenever a call finds the all trunks busy condition.

> **NOTE:**
> The number in the Group Overflow field represents the actual number of Blocked Calls.

- If the Percent Outgoing Blocking field shows a value greater than zero, the Queue Overflow and Group Overflow fields should also have values greater than zero.
- Measurement hour data reported in the System Status Report (for example, system view1 or monitor system view2) should correspond to those shown on the hourly trunk group measurements and performance reports.

## Analyzing the Data

The Trunk Group Summary Report may be used to determine:

- Average Holding Time
- Trunk Blockage
- Number of trunks required for a specified Grade of Service.

> **NOTE**
> It should be realized that data collected in a real-time environment, such as what actually happens, will virtually always deviate from the theoretically predicted data because of the asynchronous nature of processes and interactions with other events such as maintenance.

### Determining Average Holding Time

You can determine the Average Holding Time (in seconds) of a trunk group by dividing the Total Usage CCS by Calls Answered and multiplying the result by 100. A short holding time could indicate trouble.

Example:

Assume the following data is reported for a one-way trunk group:

- Total Usage CCS = 656 CCS
- Total Seizures = 260

You can determine the Average Holding Time as follows:

$$\textit{Average Holding Time} = \left(\frac{\textit{Total Usage CCS}}{\textit{Calls Seized}}\right) \times \frac{100\ \textit{Seconds}}{\textit{CCS}}$$

$$\textit{Average Holding Time} = \left(\frac{656\ \textit{CCS}}{280}\right) \times \frac{100\ \textit{Seconds}}{\textit{CCS}}$$

*Average Holding The* = *234 seconds (or four minutes* and 40 seconds)



## Determining Trunk Group Blockage

Generally, you should use either the list measurements trunk-group or list performance trunk-group report for determining trunk group blockage. All of the appropriate calculations are performed by the system and the results are displayed via the reports. However, to be complete, the equations and an example are included.

To determine the Percent Blocking for one-way outgoing and two-way trunk groups, respectively, use the following equations:

*One-Way Trunk Group (outgoing)*

$$\textit{Percent Blocking} = \left(\frac{\textit{Group Overflow}^{*}}{\textit{Total Seizures} + \textit{Group Overflow}}\right) \times 100\ \%$$

***Two-Way Trunk Group***

$$\textit{Percent Blocking} = \left(\frac{\textit{Group Overflow}^{*}}{\textit{Total Seizures} - \textit{IncomingSeizures} + \textit{Group Overflow}}\right) \times 100\ \%$$

Example:

With the following data, determine the Percent Blocking of a two-way CO trunk group (refer to the Trunk Group Measurements Report, Figure 3-35, for details regarding trunk group number 1):

- Total Seizures = 280
- Incoming Seizures = 170
- Group Overflow = 6

Using the equation for two-way trunk groups, you can estimate average Percent Blocking as follows:

$$\textit{Percent Blocking} = \left( \frac{6}{(280 - 170) + 6} \right) \times 100 = 5.2\ \%$$

## Determining the Number of Trunks Required for a Specified Grade of Service

For both stand-alone and last-choice trunk groups, you can use the trunk group peak traffic reports to determine the number of trunks that are required to provide a specified Grade of Service. The number of trunks required strictly depends on the Grade of Service that you want to provide.

**NOTE:**
Stand-alone and last-choice trunk groups do not reroute their blocked calls. As a contrast, Alternate Routing trunks do reroute their blocked calls.

The procedure for determining the optimal number of trunk members for a particular trunk group requires that you initially generate the appropriate reports and subsequently reed the data on the Trunk Group Data Worksheets. What you are attempting to accomplish is to identify the peak hour and the traffic data for that hour. The `list measurements trunk-group yesterday scheduled` command will result in generating all of the necessary data on a daily basis. You can enter 20 weekdays of data on each Trunk Group Data Worksheet. Subsequently, you need only scan the worksheet in order to identify which measurement hour occurs most frequently. The most frequent is considered the peak hour. You should use the data for the identified peak hour, that has the highest total usage, to calculate the required number of trunks.

Example 1:

Assumptions

1. You have been obtaining data (daily) and recording that data on appropriately identified Trunk Group Data Worksheets.
2. 1300 is the hour listed most frequently, thus it is the peak hour (or, bouncing peak hour).
3. Figure 3-47 (Trunk Group Status Report) represents the data for the identified peak hour that had the highest total usage.
4. Trunk Group 1 has consistently shown a high percentage of outgoing blockage and is suspected of not providing the desired Grade of Service.
5. The following measurements do not account for percentage of calls blocked.

**For two-way trunk groups the equation for determining Calls Carried is as follows:**

***Calls Carried = Total Seize***

***Calls Carried = 280***

*For Trunk Groups Without a Queue*

***TotalCalls Offered = Calls Carried + Group Overflow***

*For Trunk Groups With a Queue*

***TotalCalls Offered = Calls Carried + Queue Overflow + Queue Abandoned***

**Since Trunk Group 1 has a queue, the equation for Calls Offered is as follows:**

***TotalCalls Offered = Calls Carried + Queue Overflow + Queue* Abandoned**

***TotalCalls Offered =* 280 + 0 + 1**

***TotalCalls Offered =* 281**

**The Average Holding Time is determined as follows:**

$$\text{Average Holding Time (in seconds)} = \left.\frac{\text{Total Usage (in CCS)}}{\text{Total Seizures}}\right| \times 100$$

$$\text{Average Holding Time (in seconds)} = \left.\frac{656\ \text{CCS}}{280\ \text{seizures}}\right| \times 100$$

***Average Holding Time (in seconds) = 234.29 seconds***

Offered Load is defined as the number of calls that would have been in progress if there had been no blocking or delay. The Offered Load can be calculated as follows:

*Offered Load = Average Holding Time (in seconds) x Calls Offered*

$$\text{Offered Load } (\textit{In CCS}) = \frac{234.29 \ (\textit{in seconds}) \ x \ 281 \text{ calls}}{100 \text{ seconds } \textit{per CCS}}$$

*Offered Load (in CCS) = 658.35 CCS or 658 CCS*

The calculated Offered Load is used with the Retrial Capacity tables, to determine the number of trunks that are required to provide a specified Grade of Service. *DEFINITY® Communications System and System 75 and System 85—Traffic Theory, 555-704-504,* includes a chapter that contains the retrial tables.

The desired Grade of Service is dependent on the particular trunk type (e.g., CO, did, tie, FX, WATS, etc.) and the nature of the business that the trunk type supports. Generally, those trunk types that are least expensive (for example, CO) will be engineered for a 1 percent (P.01 ) Grade of Service. Those trunk types that are more expensive are engineered to provide from *2* percent to *5* percent (P.02 to P.05) Grade of Service.

**NOTE:**
A one percent Grade of Service means that the fraction of calls blocked during the identified bouncing peak hour, for stand-alone and last-choice trunk groups, should not exceed 1 percent.

Assuming that we desire a P.01 Grade of Service on Trunk Group 1, for the calculated Offered Load of 658 CCS, the Retrial Capacity tables in the *DEFINITY® Communications System and System 75 and System 85—Traffic Theory, 555-104-504* indicate (under the column heading GROUP SIZE) that *29* trunks are required.

The number of currently functioning (or in service) trunks is calculated as follows:

*# of In- Service Trunks = Trunk Group Size - Out of Service Trunks*

*# of h-service Trunks = 23 - 0*

*# of In- Service Trunks = 23*

Therefore, since 29 trunks are required but only 23 are currently in service, six additional trunks must be added to obtain the desired Grade of Service.

Example 2:

Assumptions

1. You have been obtaining data (daily) and recording that data on appropriately identified Trunk Group Data Worksheets.
2. 1300 is the hour listed most frequently, thus it is the peak hour (or, bouncing peak hour).
3. Figure 3-47 (Trunk Group Status Report) represents the data for the identified peak hour that had the highest total usage.
4. Trunk Group 4 indicates a higher than desired percentage of outgoing blockage.

For one-way outgoing trunk groups, the equation for determining Calls Carried is as follows:

*Calls Carried = Total Seize*

*Calls Carried = 81*

Since Trunk Group 4 does not have a queue, the equation for Calls Offered is as follows:

*Calls Offered = Calls Carried + Group Overflow*

*Calls Offered = 81 + 5*

*Calls Offered = 86*

The Average Holding Time is determined as follows:

$$\textit{Average Holding Tine (in seconds)} = \left(\frac{\textit{Total Usage (in CCS)}}{\textit{Total Calls}}\right) \times \frac{100\ \textit{seconds}}{\textit{CCS}}$$

$$\textit{Average Holding Time (in seconds)} = \left(\frac{73\ \textit{CCS}}{81\ \textit{calls}}\right) \times \frac{100\ \textit{seconds}}{\textit{CCS}}$$

*Average Holding Time (in seconds) = 90.12* seconds

Offered Load is defined as the number of calls that would have been in progress if there had been no blocking or delay. The Offered Load can be calculated as follows:

*Offered Load = Average Holding Time (in seconds) x Calls Offered*

*Offered Load (in CCS) = 90.12 (in seconds) x 86 calls*

*Offered Load (in CCS) = 77.50 CCS or 78 CCS*



The calculated Offered Load is used, with the Retrial Capacity tables, to determine the number of trunks that are required to provide a specified Grade of Service.

Assuming that we desire a P.03 Grade of Service on Trunk Group 4, then for the calculated Offered Load of 78 CCS the Retrial Capacity tables in the *DEFINITY® Communications System and System 75 and System85—Traffic Theory, 555-104-504* indicate (under the column heading GROUP SIZE) that six trunks are required. The number of currently functioning (or in-service) trunks is as follows:

*# of In- Service Trunks = Trunk Group Size - Out of Service Trunks*

*# of In-Service Trunks = 5 - 1*

*# of In-service Trunks = 4*

Therefore, since six trunks are required but only four are currently in-service, two additional trunks are needed to obtain the desired Grade of Service. The obvious options are (a) have the out-of-service trunk repaired and just add one new trunk, or (b) add two new trunks.

Example 3:

Assumptions

1. You have been obtaining data (daily) and recording that data on appropriately identified Trunk Group Data worksheets.
2. 1300 is the hour listed most frequently, thus it is the peak hour (or, bouncing peak hour).
3. Figure 3-47 (Trunk Group Status Report) represents the data for the identified peak hour that had the highest total usage.
4. That Trunk Group 2 indicates a higher % ATB than desired,

Incoming trunk groups do not have queues. Therefore, from the switch perspective you cannot determine the number of calls that are blocked. But, in this case Total Usage is actually the Carried CCS. You can use the Carried CCS with the Retrial Capacity tables, to determine the number of trunks that are required to provide a specified Grade of Service.

Assuming that you desire a P.05 Grade of Service on trunk group #2, then for a Carried CCS of 201 CCS the Retrial Capacity tables in the *DEFINITY® Communications System and System 75 and System 85—Traffic Theory* indicates (under the column heading GROUP SIZE) that 10 trunks are required. The number of currently functioning (or in-service) trunks is as follows:

*# of in- Service Trunks = Trunk Group Size - Out of Service Trunks*

*#of in-service Trunks = 6 - 0*

*# of In-service Trunks = 6*

Therefore, since 10 trunks are required but only 6 are currently in-service, four additional trunks are needed to obtain the desired Grade-of-Service. The solution is to add four trunk members to the trunk group.

# Trunk Group Call-By-Call (CBC)

## Background Information

3

1. In a non Call-By-Call Service Selection environment, a trunk group must be preassigned and provisioned for each desired service (for example, MEGACOM® telecommunications service, WATS, SDN, etc). With this arrangement, each trunk group must be designed to accommodate the peak traffic load for the intended service application. Furthermore, the time when one service application encounters peak traffic may not coincide with when another service application encounters peak traffic. As an alternative, if multiple network services are accommodated with a single trunk group (which is referred to as a CBC Trunk Group), and that trunk group is provided with allocation and scheduling controls, then significant trunking efficiencies may be realized by distributing the total traffic for all of the specified network services over the total number of available trunk members.
2. By implementing Wage Allocation Plans (UAPS) you can optimize, within certain limits, the CBC trunk group without involving any of the Inter-Exchange Carrier/Local Exchange Carrier (IXC/LEC) network services personnel. Each Usage Allocation Plan specifies the network services/features that maybe accommodated with the trunk group. It also specifies the minimum number of resewed channels and maximum number of channels that each services/feature may use at a given time.
3. The free pool concept is associated with UAPS. Specifically, free pool refers to the number of trunks that have not been reserved for a specific service/feature. The free pool is calculated as:

   *Free Pool = Total # of in- service Trunks - $\sum$ of the Mins ( for each S/F)*
4. Each Usage Allocation Plan may be administered as fixed or scheduled. With the fixed method, a specified plan remains in effect, continuously. With the scheduled method, two or three Usage Allocation Plans maybe scheduled to vary by both day of week and time of day.
5. Before you can analyze the Trunk Group CBC Measurements Report, you must know the intent of the strategy for each Usage Allocation Plan. You should have (in hand) a completed copy of the Trunk CBC Group Usage Allocation Plan and the associated Assignment Schedule, which are Pages 3 and 4 of the Trunk Group Administration Form. Refer to your Implementation, manual, or to the DEFINITY® *Communications System Generic 1—DS1/DS1/DM/ISDN-PR/ Reference, 555-025-101,* for additional details.

# Trunk Group Call-By-Call Measurements Report

**The Trunk Group Call-By-Call (CBC) Measurements Report displays last-hour traffic data for any specified cbc trunk group, provided that the trunk group had a UAP administered for the last-hour. You can use the report to monitor the trunk group and to determine if the UAP meets current needs. Whenever it is determined that changes are required, you must make these changes on the appropriate trunk group form(s).**

## Command

**To display the Trunk Group CBC Measurements Report, enter:**

list measurments cbc-trunk-group <number> last-hour [print or schedule]

Options: **The print and schedule options are available for this command.**

## Screen

**Figure 3-48 shows the Trunk Group Call-By-Call Measurements Report. The line just above the report title displays the date and time for which the report was requested. Table 3-39 describes the data fields presented in the CBC Trunk Group Measurements Report.**

```
list measurements cbc-trunk-group 99 last-hour
Switch Name:  Cust_Switch_Name
Switch Name:                                       Date: 2:15 pm WED MAY 9, 1990
                         CBC TRUNK GROUP MEASUREMENTS
                   Peak Hour For CBC Trunk Group 99 : 1300
Queue Size          : 40                          Usage Allocation Plan Used
Calls Queued        : 23                     Plan Number:  1   0   0   0   0   0
Queue Overflow      : 0                        Duration: 60   0   0   0   0   0
Queue Abandonments  : 4
Out of Service      : 0
                 Min  Max Meas Total Total  Inc.  Ovf  Ovf  Ovf  %    %   %Out
Service/Feature  Chn  Chn Hour Usage Seize  Seize  TG  S/F  Max TBM  ATB  BLK
  outwats-bnd     5    12 1300   240   333    0     0   0    23  10    2    1
  sdn             4     8 1300    40    30   22     0   0     0  62    1    0
  other           0    20 1300    70    41   36     0   0     0   0    0    0
Command successfully completed
enter command:
```

Figure 348. Trunk Group Call-By-Call Measurements Report Screen

Table 3-39. Trunk Group Call-By-Call Measurements Report

| Field | Description |
|---|---|
| Queue Size | **Size of the queue for the ISDN-PRI CBC trunk group. If zero is displayed, then no queue is administered. Hence, the other queue measurements will also be zero.**<br><br>**If the queue is administered, then it serves all of the network services/features that are administered for the trunk group, However, its functional operation is somewhat different than the queue used with conventional trunk groups. When a particular service/feature uses its allotted maximum number of channels, then any additional call attempts will be queued, even though not all of the trunks are currently being used. If the queue is already full, any additional call attempts will simply overflow with the caller receiving reorder tone.**<br><br>**Recommendations: Since one service/feature generally will not experience peak traffic the same time as another service/feature, there will be an averaging effect. Furthermore, the queue size for a CBC trunk group need not be much larger than for a non CBC trunk group. The Queue Size should be larger than the trunk group size; but, typically, not more than three times as large as the trunk group size.** |
| Calls Queued | **The total number of calls that entered the CBC trunk group queue during the peak hour. The peak hour is the hour with the greatest number of calls.** |
| Queue Overflow | **The total number of calls that were denied access to a trunk, found queue full, and the caller received reorder tone.**<br><br>Suggested Actions: **Generally, this field will indicate the number O. If this field indicates a high number, then:**<br><br>**1. the queue size may be too small, or**<br>**2. more trunks may be needed so that less calls will queue, or**<br>**3. the UAP maybe too restrictive (for example, some of the “Min Chn” values maybe to high, or some of the “Max Chn” values may be too low). Also, see Suggested Actions in the % TBM description.** |

***Continued on next page***

Table 3-39. Trunk Group Call-By-Call Measurements Report (Continued)

| Field | Description |
|---|---|
| Queue Abandonments | The number of calls that were removed from the queue by either the system or the user. The system automatically removes calls from the queue after 30 minutes. A user may abandon his/her call by canceling the Automatic Callback feature (that was set earlier to place their call in the queue).<br><br>Suggested Action: If the last-hour measurement report also happens to be the peak-hour, then the data maybe used to make a decision regarding whether the queue size is comet. Recall that a trunk group and its associated queues are sized to accommodate peak-hour traffic loads. Typically, this field will indicate a small number. However, a large number will generally indicate that the queue size is too large and that people are abandoning because they have remained in queue for a being time. Consider adding more trunks so that calls will not queue as fast. |
| Out of Service | The number of trunks in the trunk group that are out of service at the time the measurements are collected. An individual trunk maybe taken out of service, (a) automatically by the switch whenever an excessive number of errors occur, or (b) by maintenance personnel in order to run diagnostic tests.<br><br>Suggested Action: If the trunks were removed from service by the switch, then the appropriate maintenance personnel should be notified. The objective is to keep all members of a trunk group in service. Generally, you should not make adjustments to the CBC trunk group because of Out of Service trunks, but should get those trunks returned to service. |
| Usage Allocation Plan Used | A list of the Usage Allocation Plan numbers followed by a list of the respective amount of time (in minutes), the duration, that each plan was in effect during the measurement interval. The Number field can display up to a maximum of six plan numbers.<br><br>A maximum of three different usage allocation plans (that are identified by the numbers 1,2, and 3) may be defined for each trunk group. All three plans are defined on Page 3 of the trunk group form. Page 4 of the corresponding trunk group form is where you administer plan assignments. |

*Continued on next page*

Table 3-39. Trunk Group Call-By-Call Measurements Report (Continued)

| Field | Description |
|---|---|
| Usage Allocation Plan Used (contd) | Each CBC trunk group is administered with either "fixed" allocation or "sheduled" allocation. When administered as fixed, it remains in effect continuously. Whenever it is administered as scheduled, the designated plans are activated on a per-day and time-of-day basis that is determined by the schedule. |
| Service/Feature | The names of up to ten services/features and the special identifier "other" for which the associated measurements are being reported.<br><br>The following services/features can be administered in a UAP:<br><br>ACCUNET® digital service<br>inwats<br>int800<br>lds<br>MEGACOM telecommunications service<br>MEGACOM 800 telecommunications service<br>MULTIQUEST® telecommunications service<br>operator<br>outwats-bnd<br>sdn<br>sub-operator<br>wats-max-bnd<br><br>The special identifier "other' is used to report activity for any service or feature not specified in the current UAP. If no UAP was in effect at the measurement interval, no report is made.<br><br>If public network access is to an LEC or to an IXC other than AT&T, then that carrier's ISDN service/features are listed, provided they have been administered as a user-defined service/feature. |
| Min chn | *Minimum number of channels.* The minimum number of channels in the ISDN-PRI CBC trunk group allocated to the specified service/feature at the time the measurements were collected. |
| Max Chn | *Maximum number of channels.* The maximum number of channels in the ISDN-PRI CBC trunk group allocated to the specified service or feature at the time the measurements were collected. |

*Continued on next page*

Table 3-39. Trunk Group Call-By-Call Measurements Report (Continued)

| Field | Description |
|---|---|
| `Total Usage` | The sum of time, in hundred-call-seconds (CCS), for all channels that were used by the specified service/feature during the measurement interval (36 CCS or 60 minutes). |
| `Tot al Seize` | The total number of incoming and outgoing calls that requested the specified sewice/feature through the ISDN-PRI CBC trunk group. |
| `Inc. Seize` | Incoming seize. The total number of incoming calls that requested the specified service/feature through the ISDN-PRI CBC trunk group.<br><br>For two-way and outgoing trunks, the number of Outgoing Seizures can be calculated as follows:<br><br>Out *Seize = Total Seize - In Seize* |
| `Tan Seize` | *Tandem Seize. The* total seizures using this Feature/Service, that are tandem seizures (i.e., terminate to another trunk rather than to a station). |
| `Ovf TG` | Overflow trunk group. The number of outgoing calls that requested the specified service/feature, on the ISDN-PRI CBC trunk group, but were not carried because the calls arrived to find that no idle trunk members were available and the free pool is empty.<br><br>**NOTE:**<br>There are three overflow fields, each of a different priority. They are: overflow trunk group (`ovf TG`) (priority 1), overflow maximum (`ovf Max`) (priority 2), and overflow services/features (`Ovf S/F`) (priority 3). Although more than one of these fields may have a value other than zero (0), only one will be displayed with a value other than 0 — the one with the highest priority level. |

*Continued on next page*

Table 3-39. Trunk Group Call-By-Call Measurements Report (Continued)

| Field | Description |
|---|---|
| Ovf S/F | **Overflow *services/features.* The number of calls that requested the specified service/feature but were denied because the calls arrived under the following conditions:**<br>■ **The specified service/feature was at or above its minimum than-" nel allocation (that is-no explicitly resewed channels remain).**<br>■ **There were idle channels available in the trunk group, but they had been resewed to meet the minimum channel allocation for other service/features.** |
| Ovf s/F (Contd) | Suggested Actions:<br>1. **Investigate the possibility of raising the "Min Chn" requirements for this service/feature.**<br>2. **Investigate the possibility of increasing the number of members for the trunk group.**<br>3. **Determine whether or not the "Min Chn" assignments for the other services/features are appropriate. For example, if the column % TBM" displays a high number for one or more of the other service/features, then you can lower the minimums (for one or more of the other services/features). This will make available more trunks for this service/feature.**<br>**NOTE:**<br>**There are three overflow fields, each of a different priority. They are: overflow trunk group (`ovf TG`) (priority 1), overflow maximum (`Ovf Max`) (priority 2), and overflow services/features (`Ovf s/F`) (priority 3). Although more than one of these fields may have a value other than zero (0), only one will be displayed with a value other than 0 — the one with the highest priority level.** |

*Continued on next page*

Table 3-39. Trunk Group Call-By-Call Measurements Report (Continued)

| Field | Description |
|---|---|
| `ovf Max` | ***Overflow maximum. The*** **number of calls that were not carried bemuse the calls originated at a time when the service/feature had already used-up its allotted maximum number of channels. In this case, the trunk group may still have trunk members available for the other services/features.**<br><br>Suggsetsd Actions:<br><br>**1. Investigate the possibility of raising the number that is administered in the Max Chn field.**<br><br>**This is only possible provided that the free pool is not exceeded. To determine whether or not you have more trunk available for a S/F calculate the following:**<br><br>***Free Pool = Total # of in-service trunks -*** $\sum$ ***Min* for *each S/F***<br><br>***Max - Min ( for the identified S/F)*** $\leq$ ***Free Pool***<br><br>**For example, using the data presented in Figure 3-48.**<br><br>***Free Pool = 9***<br><br>***8-4( for SDN)*** $\leq$ ***23 trunks - 9***<br><br>***4* < 14 Therefore, *you can increase the Max***<br><br>**2. Consider adding more trunks to the trunk group and increase the maximum for the identified sewice/feature.**<br><br>**NOTE:**<br>**There are three overflow fields, each of a different priority. They are: overflow trunk group (`ovf TG`) (priority 1 ), overflow maximum (`Wf Max`) (priority 2), and overflow sewice/features (`ovf s/F`) (priority 3). Although more than one of these fields may have a value other than zero (0), only one will be displayed with a value other than O — the one with the highest priority level.** |

*Continued on next page*

Table 3-39. Trunk Group Call-By-Call Measurements Report (Continued)

| Field | Description |
|---|---|
| % TBM | ***Percentage of trunks below minimum. The*** **percentage of time during the polling interval that the number of channels in use by the specified service/feature is below the specified minimum.**<br><br>**Suggested Action: Lower the "Min Chn" since this maybe the cause for the "Ovf S/F".**<br><br>**NOTE:**<br>**If the field"% TBM" is high, then you are resewing more trunk members than will be used. Determine if another service/feature needs more trunks and, if so, lower the "Min Chn" for this service/feature.** |
| % ATB | ***Percentage All Trunks Busy (ATB).*** **The percentage of time (0 to 100%) during the measurement interval that the specified service/feature could not get a channel because of at least one of the following reasons:**<br>■ **All trunks in the lSDN-PRICBC trunk group were busy on a call or busied-out by maintenance.**<br>■ **This service/feature was above ifs minimum; and all available trunks were reserved for other features/services that were below their minimums.**<br>■ **The specified feature or service was at its maximum number of channels.**<br><br>**Suggested Action: Theoretically, a high number in this field and zero in the fields ("Ovf TG", "Ovf S/F", and "Ovf Max") would indicate that everything is functioning perfectly. However, a more typical scenario would be a high number in this field and also high numbers in the "Ovf TG", "Ovf S/F", and/or "Ovf Max" fields. This would indicate a problem and necessitate one of the following corrective actions.** |

*Continued on next page*

Table 3-39. Trunk Group Call-By-Call Measurements Report (Continued)

| Field | Description |
|---|---|
| % ATB (Contd) | 1. A number in the Ovf TG field indicates that the physical maximum number of trunks has been exhausted. If this is "Preference 1" of the routing pattern, then overflow is just to the second choice trunk group. Otherwise, the obvious choice is to add more trunks to the trunk group.<br>2. If the Ovf S/F field indicates a problem (for example, a significant number), refer to Suggested Actions in the Ovf S/F description.<br>3. If the Ovf Max field indicates a problem (a significant number), refer to Suggested Actions in the Ovf Max description. |
| % BLK | *Percentage outgoing blocking.* The ratio of outgoing calls not carried for a specified service/feature to the outgoing calls offered by the service/feature. For an ISDN-PRI CBC trunk group with no queue, the calls not carried are those calls that find all facilities busy for the specified service/feature. For an ISDN-PRI CBC trunk group that has a queue, the calls not carried are those calls that find all facilities for the specified service/feature busy and cannot be queued because the queue is full.<br>Suggested Actions:<br>1. Look at the % ATB column and identify any service/feature that has a high value. Follow the Suggestad Actions in the % ATB description.<br>2. You can increase the length of the queue rather than adding more trunks. Subsequently, you should monitor the Queue Abandonments field to insure that it stays within reasonable limits.<br>3. If conditions are such that Item 1 above is not appropriate, then you may find it necessary to add more trunks. |

# Processor Occupancy Reports

4



## Processor Occunancy Reports

The term Processor Occupancy (which is also referred to as just Occupancy) is defined as the percentage of time that the switch processor is busy performing call processing tasks, maintenance tasks, administration tasks, and the operating system support for each of these tasks. As a contrast, the percentage of time that the processor is not used is referred to as Idle Occupancy.

The primary objectives of the processor occupancy reports are:

- To provide a summary of customer usage data so that processor occupancy and available capacity can be determined
- To display, on a per time interval basis, the processor occupancy and associated calling rates which facilitates the isolation of certain customer reported problems

There are five different processor occupancy commands. These commands are:

- list measurements occupancy summary
- list measurements occupancy last-hour
- list measurements occupancy busiest-intervals
- list measurements occupancy pktint
- list measurements communications-links

The first three commands provide processor occupancy data and associated call traffic for different measurement intervals. The pktint report provides 24 hours of occupancy data for each of the processor packet interface (pktint) boards in the system. The last command provides a picture of the traffic data that is generated on each processor interface link.

The processor occupancy commands may be executed from all user logins. However, for most systems, the two primary users will be (1) the customers' telecommunications manager, and (2) the service technician.

The type of traffic application can significantly affect processor occupancy. Therefore, for purposes of determining processor occupancy, the customers' calling traffic is defined as one of the following applications:

- General Business-the majority of applications. It does not include the impact of the Inbound Call Management (ICM)/Call Management System (CMS) or CallVisor® Adjunct Switch Applications Interface (ASAI)/Outbound Call Management (OCM) applications.
- ICM/CMS—only includes the impact due to the ICM traffic (using the ACD, Call Vectoring, CallVisor ASAI and CMS features).
- CallVisor ASAI/OCM—only includes the impact due to ASAI/OCM applications.

**NOTE:**
A particular switch may have a traffic bad that consists of any combination of the three defined applications.

Depending on the customers' specific application, the calling traffic maybe as simple as a single switch with only CO trunks and analog sets or as complex as a switch in a multinode private network that uses both DCS and ISDN features and is configured with digital sets. In order to describe this wide range of traffic, four call categories are defined. The call categories are:

- Intercom (INTCOM)—locally made and completed station-to-station calls.
- Incoming (INC)—calls which come into the switch over trunks from a CO. The following trunk types are considered public network incoming (CO, DID, FX, WATS, and ISDN—PRI calls that have a public network service type).
- Outgoing (OUT)—calls which exit the switch on trunks that terminate in a CO. The following trunk types are considered public network outgoing (CO, WATS, FX, and ISDN-PRI calls that have a public network service type).
- Private Network (PNET)—incoming and outgoing calls that are made over private network trunks. The following trunk types are considered private network (Access, CPE, DMI-BOS, RLT, Tandem, Tie, APLT, and ISDN-PRI that have a private network service type).

A customer's Usage Profile is defined as the percent mix of traffic from each of the four call categories. An example of one Customer Usage Profile would be: INTCOM = 34%, INC = 33%, OUT= 33%, and PNET = 0%. Obviously, many other different combinations are also possible.

Once the traffic application, usage profile, and certain feature use loading factors have been determined it is then possible to calculate the Busy Hour Call Capacity (BHCC). The BHCC is a measure of the switch's capacity and is defined as the maximum number of completed calls the switch can support in an hour without degradation of service.

It should also be understood that, as a part of the RFP process, AT&T marketing, when given a description of the customer's usage profile, traffic application, and certain feature use loading factors for the proposed switch, can calculate the theoretical maximum BHCC for the specified application. This enables the determination of whether the proposed switch will accommodate the traffic load. This number, the theoretical maximum BHCC, is an estimate and is referred to as the predicted maximum BHCC.

## The Summary Command

This section describes the Summary Command and the Processor Occupancy Summary Report.

### When to Use the Summary Command

The main function of this command is to answer the question, “How much of the system is being used?” More specifically, this command should be used whenever you want to:

- Monitor resource usage
- Validate the customer's usage profile (for example, once the switch is installed and calling traffic is normal, use the summary reports to determine if the actual usage profile is the same as the estimated usage profile)
- Determine the idle occupancy and how much is available for growing the switch
- Detetmine the processor occupancy and call levels on an hourly basis for the last 24 hours.

# Processor Occupancy Summary Report

## Command

**To display the Processor Occupancy Summary Report, enter:**

list measurements occupancy summary [print or schedule]

Options: **The print and schedule options are available for this command.**

## Screen

**Figures 4-1,4-2 and 4-3 show typical output for the Processor occupancy Summary Report. The time and date that the report was requested are displayed "above and to the right of the name of the report.**

**Table 4-1 describes the data fields presented in the Processor Occupancy Summary Last Hour/Busiest Interval Report.**

```
Switch Name:  Customer_Switch_name                                  Page 1
                                         Date: 11:33 am  TUE JUL 31, 1990
                          OCCUPANCY SUMMARY MEASUREMENTS
                          Peak Hour For Occupancy: 1000
Meas   Stat   CP    Sm    Idle   Total   Total   Intcom  Inc    Out    Pnet
Hour   Occ    Occ   Occ   Occ    Calls   Atmpt   Atmpt   Atmpt  Atmpt  Atmpt
   0   4      13    22     61    28463   43908   3970     0      0     39938
2300   5      14    23     58    35626   51094   5784     0      0     45310
2200   5      14    23     58    35632   51120   5783     0      0     45337
2100   5      14    23     58    35645   51130   5788     0      0     45342
2000   5      16    24     55    24342   31756   3590     0      0     28166
            press CANCEL to quit -- Press NEXT PAGE to continue
```

Figure 4-1. Processor Occupancy Summary Report Screen

list measurements occupancy summary Page 2
Date: 11:33 am TUE JUL 31, 1990
OCCUPANCY SUMMARY MEASUREMENTS
Peak Hour For Occupancy: 1400

| Meas Hour | Stat Occ | CP Occ | Sm Occ | Idle Occ | Total Calls | Total Atmpt | Intcom Atmpt | Inc Atmpt | Out Atmpt | Pnet Atmpt |
|---|---|---|---|---|---|---|---|---|---|---|
| 1900 | 5 | 58 | 15 | 22 | 761 | 989 | 247 | 193 | 251 | 298 |
| 1800 | 5 | 58 | 16 | 21 | 1032 | 1341 | 335 | 371 | 301 | 334 |
| 1700 | 5 | 57 | 16 | 22 | 1442 | 1875 | 468 | 451 | 421 | 535 |
| 1600 | 5 | 58 | 15 | 22 | 2301 | 2991 | 747 | 710 | 753 | 781 |
| 1500 | 5 | 57 | 15 | 22 | 2769 | 3509 | 877 | 932 | 748 | 952 |
| 1400 | 5 | 58 | 15 | 22 | 2959 | 3846 | 961 | 991 | 928 | 966 |
| 1300 | 5 | 57 | 15 | 23 | 2997 | 3896 | 974 | 1021 | 900 | 1001 |
| 1200 | 5 | 59 | 15 | 21 | 4221 | 5487 | 1371 | 1520 | 745 | 1851 |
| 1100 | 5 | 59 | 15 | 21 | 5001 | 6501 | 1625 | 2000 | 1223 | 1653 |
| 1000 | 4 | 59 | 13 | 24 | 5241 | 6813 | 1703 | 2066 | 1165 | 1879 |

press CANCEL to quit -- Press NEXT PAGE to continue

Figure 4-2. Processor Occupancy Sumrnary Report Screen

list measurements occupancy summary Page 3
Date: 11:33 am TUE JUL 31, 1990
OCCUPANCY SUMMARY MEASUREMENTS
Peak Hour For Occupancy: 1400

| Meas Hour | Stat Occ | CP Occ | Sm Occ | Idle Occ | Total Calls | Total Atmpt | Intcom Atmpt | Inc Atmpt | Out Atmpt | Pnet Atmpt |
|---|---|---|---|---|---|---|---|---|---|---|
| 0900 | 5 | 65 | 12 | 18 | 5392 | 7011 | 1752 | 2045 | 1203 | 2011 |
| 0800 | 5 | 64 | 14 | 17 | 5364 | 6973 | 1743 | 2056 | 1283 | 1891 |
| 0700 | 5 | 58 | 15 | 22 | 5423 | 7049 | 1762 | 2070 | 1346 | 1871 |
| 0600 | 6 | 60 | 17 | 17 | 4399 | 5719 | 1430 | 2195 | 569 | 1525 |

Command successfully completed
enter command:

Figure 4-3. Processor Occupancy Summary Report Screen

Table 4-1. Processor Occupancy Summary Report

| Field | Description |
|---|---|
| Meas Hour | *Measurement Hour. The* starting time (using 24-hour clock) of the hour during which the data was recorded. Data is lied beginning with the most mostly completed hour and preceding back for 24-hour intervals. Refer to the *DEFINITY® Communications System Generic 1 and Generic 3i — System Description, 555-230-200* manual for additional details. |
| Mess Min | *Measured Minute.* (Last-Hour Sub-Report) The start 3 minute interval for which the measurement is taken. it takes the form hh:mm, where “hh” is the hour and ‘mm” is the 3 minute interval. |
| Date of occur | *Date of Occurrence.* (Busiest-interval Sub-Report) The date and time which coincides with a line of busiest-interval data. It takes the form MM/dd/mm:hh, where “MM” is the month, “dd” is the day, ‘hh” is the hour and “mm” is the 3-minute interval. |
| Stat Occ | *Static Occupancy. The* amount of time taken by high priority background processes in support of call processing, maintenance, and administration functions. Examples of this activity are high level sanity checks, system timing, polling of adjuncts, and operating system support. This also includes some call processing occupancy for BX.25 and ISDN-PRI traffic.<br><br>**NOTE:**<br>Static Occupancy remains fairly consistent in an idle switch. However, it increases as traffic is introduced into the system. |

*Continued on next page*

Table 4-1. Processor Occupancy Summary Report (Continued)

| Field | Description |
|---|---|
| CP Occ | *Call Processing occupancy.* The amount of time taken by call processing level processes. The processing of SMDR, DCS, ISDN, and other adjunct interfaces is also included in this level. Note that some occupancy due to BX.25 and ISDN-PRI call traffic is counted as static occupancy instead of CP Occ.<br><br>**NOTE:**<br>It is not desirable for any system to function at 100 percent Processor Occupancy. Rather, the `CP occ` and `stat occ` fields should total no more than a maximum of 75 percent. By maintaining this 75 percent maximum limit, other system functions can be performed and bursts of caller activity can also be accommodated.<br><br>Suggested Actions: If the 75 percent maximum limit is exceeded, then you should take one or more of the following steps to lower Call Processing Occupancy:<br><br>1. If the users do not get a dial tone immediately, they should be encouraged to wait 10 to 15 seconds before going on-hook and off-hook again.<br><br>2. If the switch is part of a private network and is receiving a large amount of traffic from another switch in the private network, then investigate the possibility of reconfiguring the network<br><br>3. Check the administration translation and verify that all digital sets, which are administered with display modules, actually have display modules. For those sets that do not have display modules, you should change the administration translations to indicate that the digital set does not have a display module.<br><br>4. Check the hardware error log for high levels of maintenance activity. |

*Continued on next page*

Table 4-1. Processor Occupancy Summary Report (Continued)

| Field | Description |
|---|---|
| Sm Occ | *System Management Occupancy.* The amount of time taken by lower priority activities such as administration and maintenance command processing, maintenance activity, error logging, and Light-Emitting Diode (LED) audits. Refer to your *DEFINITY® Genetic 1 and Generic 3i — System Description, 555-230-200* manual for additional details. |
| Idle OCC | *Idle Occupancy. The* amount of time that the processor is unused. Care must be taken in using this number. As extensions are added and as features are enabled, the amount of system maintenance required also increases. Therefore, not all of the idle occupancy can be allocated to call processing. But, a certain capacity must be held in reserve so that the switch can accommodate bursts of calling activity. Specifically, the AT&T recommendation is that Idle Occupancy should not go below 15 pecent for a sustained period. |
| Total Calls | *Total Calls.* The total number of calls completed during the listed hour. Calls are counted in the time interval they are answered and not in the time interval they are dropped. Therefore, a call that starts in one time interval and ends in another is counted only in the time interval where it originates. |

*Continued on next page*

4

Table 4-1. Processor Occupancy Summary Report (Continued)

| Field | Description |
|---|---|
| Total Atmpt | *Tots/ Attempts. The* number of call attempts made during the measurement interval. The following occurences count as an attempt:<br>■ A user lifts the station handset and hangs up before dialing any digits (off-hooks)<br>■ A user lifts the station handset, dials the destination number, the far end rings but does not answer, and the user hangs up (no answer)<br>■ A user lifts the station handset, dials the destination number, the far end is busy<br>■ A user places a call that is answered by the dialed number<br>■ A user conferences a second party onto the call<br>■ An incoming trunk seizure<br>■ Maintenance requests that an outgoing trunk be seized.<br>■ Tandem calls (either pnet or public network) result in 2 attempts, but only one total call<br>■ AUDIX audits of message waiting lamps<br>■ AUDIX Leave Word Calling activations<br>**NOTE:**<br>Mathematically, the Total Atmpt field is the total of the Intcom, Inc, Out, and Pnet attempts. |
| Intcom Atmpt | Intecom *Attempts.* This field includes the sum of two types of calls. The first type is extension-to-extension calls on the same switch. The second type is partially completed calls where a local extension goes off-hook and then hangs up before the call is answered. This includes both busy and no-answer calls. |
| Inc Atmpt | *Incoming Attempts. The* number of incoming trunk seizures from public network facilities. |

*Continued on next page*

Table 4-1. Processor Occupancy Summary Report (Continued)

| Field | Description |
|---|---|
| Out Atmpt | *Outgoing Attempts. The* number of outgoing trunk seizures that are made over public network facilities. |
| Pnet Atmpt | *Private Network Attempts. The* number of incoming and outgoing seizures that are made over private network facilities. Note that a tandem call is counted as two private network attempts, since it includes both incoming and outgoing trunk seizures.<br><br>**NOTE:**<br>The determination of whether a call is over public network or over private network facilities depends on the trunk type (for ISDN-PRI facilities it is also dependent on the service type). |

# The Last-Hour Command

## When to Use the Last-Hour Command

The main function of the last-hour command is to:

- Provide a detailed view of the occupancy levels for the last-hour
- Identify potential load related problems that may have occurred during the last hour.

# Processor Occupancy Last-Hour Measurements Report

Command

To display the Processor Occupancy Last-Hour Report, enter

list measurements occupancy last-hour [print or schedule]

Options: The print and schedule options are available for this command.

Screen

**Figures 4-4 and 4-5 show typical output for the Processor Occupancy Last-Hour Measurements Report. The time and date that the report was requested are displayed above and to the right of the name of the report.**

```
Switch Name: Customer_Switch_name                                       Page 1
                                            Date:  3:13 pm  MON NOV 11, 1991
                      OCCUPANCY LAST-HOUR MEASUREMENTS
Meas   Stat   CP    Sm    Idle   Total   Total   Intcom   Inc    Out    Pnet
Min    Occ    Occ   Occ   Occ    Calls   Atmpt   Atmpt    Atmpt  Atmpt  Atmpt
15:11   2      5    26    67      646    1421       0      0      0     1421
15:08   4      5    22    69      641    1412       0      0      0     1412
15:05   5      6    25    64      639    1410       0      0      0     1410
15:02   4      6    24    66      645    1420       0      0      0     1420
14:59   3      4    22    71      639    1411       2      0      0     1409
14:56   3      5    24    68      639    1412       2      0      0     1410
14:53   6      6    24    64      645    1418       3      0      0     1415
14:50   4      5    27    64      641    1418       3      0      0     1415
14:47   4      6    19    71      648    1429       3      0      0     1426
14:44   2      5    26    67      639    1405       3      0      0     1402
14:41   4     14    19    63     1624    2399     243      0      0     2156
14:38   6     15    28    51     1786    2556     290      0      0     2266
                 press CANCEL to quit -- press NEXT PAGE to continue
```

Figure 44. Processor Occupancy Last-Hour Measurements Report Screen

```
list measurements occupancy last-hour                                   Page 2
                                            Date:  3:13 pm  MON NOV 11, 1991
                      OCCUPANCY LAST-HOUR MEASUREMENTS
Meas   Stat   CP    Sm    Idle   Total   Total   Intcom   Inc    Out    Pnet
Min    Occ    Occ   Occ   Occ    Calls   Atmpt   Atmpt    Atmpt  Atmpt  Atmpt
14:35  6      57    15    22     191     248     62       66     64     56
14:32  5      59    15    21     187     243     60       54     56     73
14:29  4      57    14    25     177     230     57       61     54     58
14:26  6      69    14    11     221     287     71       75     67     74
14:23  5      66    14    15     225     292     73       77     74     68
14:20  5      63    14    18     224     291     72       76     76     67
14:17  5      57    15    23     219     284     71       76     64     73
14:14  5      57    13    25     223     289     72       74     64     79
Command successfully completed
enter command:
```

Figure 4-5. Processor Occupancy Last-Hour Measurements Report Screen

4

**NOTE:**
The fields on this report are the same as the summary report, but the data is calculated over a 3-minute time interval. The `Meas Min` field represents the end of the time interval.

## Using the Last-Hour Report to Resolve Problems

The following list identifies some areas that may be pursued when investigating a problem that is believed to be processor occupancy (load) related.

1. For the identified 3-minute time interval (the time when the problem occurred), multiply the number in the `Total Calls` field by 20. If the product exceeds the advertised BHCC of the switch, then it is the bad for this time interval that is causing the problem. If the product does not exceed the BHCC for the switch, then this load is not the problem.
2. For the identified 3-minute time interval (the time when the problem occurred), compare the number in the `Total atmpt` field with the `Total Calls` field. If the number of attempts is significantly greater than the number of calls, then a significant percent of the occupancy is due to processing off-hook and on-hook stimuli that do not result in a completed call.
3. Examine the hardware error log for an excessive amount of maintenance activity (for example, a high number of errors).
4. Refer to the list measurement communications-links report to determine if any of the links are receiving an abnormal amount of traffic.
5. Check with the users to determine if a certain feature(s) was being used heavily during the identified time interval.
6. Refer the problem to maintenance personnel with the suggestion that they check the software error log.

# The Busiest-Interval Command

This section describes the Processor Occupancy Busiest-interval Measurements report.

## When to Use the Busiest-Interval Command

The main function of the busiest-interval command is to provide a long-term history report of potential performance-related problems.

**NOTE:**
This report provides a collection of the 20 busiest 3-minute intervals within the last two months. Therefore, this command is most useful to the service technician for investigating habitual performance problems or those problems that are not reported exactly when they happen.

# Processor Occupancy Busiest-Interval Measurements Report

## Command

**To display the Processor Occupancy Busiest-Interval Measurements Report, enter:**

list measurements occupancy busiest-interval [print or schedule]

Options: **The print and schedule commands are available for this command.**

## Screen

**Figures 4-6 and 4-7 show typical output for the Processor Occupancy Busiest-Interval Measurements Report. The time and date that the report was requested are displayed above and to the right of the name of the report. The `Date of Occur` field identifies the month, day, and time of day for 20 of the busiest intervals (that is, the sum of Stat Occ + CP Occ). All other fields are described in Table 4-1.**

```
Switch Name:  Customer_Switch_name                                          Page 1
                                              Date:  3:13 pm  MON NOV 11, 1991
              OCCUPANCY BUSIEST 3-MINUTE INTERVALS MEASUREMENTS
Date of       Stat  CP    Sm    Idle  Total   Total  Intcom  Inc    Out    Pnet
Occur         Occ   Occ   Occ   Occ   Calls   Atmpt  Atmpt   Atmpt  Atmpt  Atmpt
11/11/10:20   16     9    26    49     686    1225    245     0      0      980
11/11/11:14    8    16    27    49    1788    2558    286     0      0     2272
11/11/12:38    7    15    21    57    1786    2554    286     0      0     2268
11/11/13:41    6    16    26    52    1786    2553    290     0      0     2263
11/11/14:11    7    15    25    53    1780    2557    285     0      0     2272
                 press CANCEL to quit -- Press NEXT PAGE to continue
```

Figure %. Processor Occupancy Busiest-Interval Measurements Report Screen

```
list measurements occupancy busiest-interval                                  Page 2
                                                  Date:  1:29 pm  TUE JUL 31, 1990
           OCCUPANCY BUSIEST 3-MINUTE INTERVALS MEASUREMENTS
Date of      Stat   CP    Sm    Idle  Total   Total  Intcom  Inc    Out    Pnet
Occur        Occ    Occ   Occ   Occ   Calls   Atmpt  Atmpt   Atmpt  Atmpt  Atmpt
07/22/01:14  13     70    17    0     308     400    101     106    91     102
07/22/05:20  12     72    16    0     309     405    102     111    94     98
07/20/07:12  13     72    15    0     307     401    100     110    98     93
07/21/08:06  13     71    16    0     310     407    101     191    91     116
07/21/10:53  11     73    15    1     315     409    101     112    97     99
07/21/20:02  4      81    12    3     321     435    108     1112   96     119
07/21/14:52  9      79    12    0     323     421    92      118    105    106
07/21/11:19  8      80    12    0     211     274    94      93     51     36
Command successfully completed
enter command:
```

Figure 4-7. Processor Occupancy Busiest-Interval Measurements Report Screen

**NOTE:**
**The fields on this report are the same as on the summary report. However, the data is calculated over 3-minute intervals rather than 1-hour intervals.**

## Using the Busiest-Interval Report to Resolve Problems

The following list identifies some areas that may be pursued when investigating a problem that is believed to be processor occupancy (load) related.

1. For the identified 3-minute time interval (the time when the problem occurred), multiply the number in the `Total Calls` field by 20. If the product exceeds the advertised BHCC of the switch, then it is the bad for this time interval that is causing the problem. If the product does not exceed the BHCC for the switch, then this bad is not the problem.
2. For the identified 3-minute time interval (the time when the problem occurred), compare the number in the `Total atmpt` field with the `Total CallS` field. If the number of attempts is significantly greater than the number of calls, then a significant percent of the occupancy is due to processing off-hook and on-hook stimuli that do not result in a completed call.
3. Examine the hardware error log for an excessive amount of maintenance . activity (for example, a high number of errors).
4. Refer to the list measurements communications-links report to determine if any of the links are receiving an abnormal amount of traffic.
5. Check with the users to determine if a certain feature(s) was being used heavily during the identified time interval.
6. Refer the problem to maintenance personnel with the suggestion that they check the software error log.

After a serious performance problem has been detected and corrected, you can execute the clear measurements occupancy busiest-intervals command and clear the log of busiest entries. This allows attention to be focused on any current performance problems.

**NOTE:**

The clear measurements occupancy busiest-intervals command -should only be used to clear out data from resolved problems.

# The Pktint Command

This section describes the Processor Occupancy Pktint Command

## When to Use the Pktint Command

Use the Pktint command to provide a 24-hour history of the ococupancy of each of up to three Packet Interface (pktint) boards.

# Processor Occupancy Pktint Sub-Report



### Command

To display the Processor Occupancy Pktint Sub-Report, enter:

list measurements occupancy pktint [print or schedule]

Options: The print and schedule options are available for this command.

### Screen

Figure 4-8 shows typical output for the Processor Occupancy Pktint Sub-Report. Table 4-2 describes those fields that are unique to the Processor Occupancy Pktint Sub-Report.

```
PKTINT Occupancy Report 5-16:
Switch Name:  Customer_Switch_Name          Date:  5:35 pm  FRI NOV 22, 1991
                   PROCESSOR PACKET INTERFACE REPORT
Meas               PKT_INT1           PKT_INT2              PKT_INT3
Hour                 Occ                Occ                   Occ
1600                  2                  0    BRDNINST         0    BRDNINST
1500                  2                  0    BRDNINST         0    BRDNINST
1400                  2                  0    BRDNINST         0    BRDNINST
1300                  2                  0    BRDNINST         0    BRDNINST
1200                  2                  0    BRDNINST         0    BRDNINST
1100                  2                  0    BRDNINST         0    BRDNINST
1000                  2                  0    BRDNINST         0    BRDNINST
 900                  2                  0    BRDNINST         0    BRDNINST
 800                  2                  0    BRDNINST         0    BRDNINST
 700                  2                  0    BRDNINST         0    BRDNINST
 600                  2                  0    BRDNINST         0    BRDNINST
 500                  2                  0    BRDNINST         0    BRDNINST

                 press CANCEL to quit -- press NEXT PAGE to continue
```

Figure 4-8. Processor Occupancy Pktint Sub-Report Screen

Table 4-2. Processor Occupancy Pktint Sub-Report

| Field | Description |
|---|---|
| **Meas Hour** | ***Measumnent Hour.*** **The starting hour in which the meaurements are taken.** |
| **PKT-INTN Occ** | **Nis either 1, 2, or 3, representing each of the 3 PKTINT boards. The percent occupancy is retrieved from each PKTINT board for the hour. If a board is not inserted, this field will display a O with the note BRDNINST indicating that the board was not inserted. If the board is out of service this field will display a O with the note OUTSERV indicating that the board was out of service. If the data cannot be retrieved from the board because of some internal problem, this field will display a O with the note DA_N_AVAIL indicating that the data cannot be retrieved.**<br>Suggested Action: **The occupancy should generally run about two percent. At occupancy nears 100%, you should consider adding another PKTINT.** |

## When to Use the Communication Link Command

The main function of the communication link command is to:

- Obtain a report that facilitates the monitoring of link traffic
- Determine if it is necessary to perform load balancing.
- Identify defective processor interface link(s)

**NOTE:**

The three processor occupancy commands described earlier may (depending upon the application) indicate that the switch is running at capacity, in keeping with user perceptions. However, these commands, with the exception of pointing to a call overload, do not provide any extra information as to why it is running at capacity. This command provides additional insight into how the processor interface links affect occupancy (for example, link overload, link transmission problems, etc.).



## Processor Occupancy Communications Link Measurements Report

### Command

To display the Processor Occupancy Communications Links Measurements Report, enter:

`list measurements communications-links [print or schedule]`

Substitute either "1 -8" or '9-16" for "xx-w" on the command line.

*Options:* The print and schedule options are available for this command.

### Screen

Figures 4-9 and 4-10 show typical output for the Processor Occupancy Communication Link Measurement Report. The time and date that the report was requested are displayed above and to the right of the name of the report. Table 4-3 describes the data fields presented in Figures 4-9 and 4-10.

```
list measurements communications-links                                  Page 1
                                                Date:  1:55 pm  TUE JUL 31, 1990
                             COMMUNICATION LINK MEASUREMENTS
```

| Meas Hour | Link 1 | Link 2 | Link 3 | Link 4 | Link 5 | Link 6 | Link 7 | Link 8 |
|---|---|---|---|---|---|---|---|---|
| 1200 | 10471 | 576 | 24 | 4 | 0 | 40 | 2 | 0 |
| 1100 | 13764 | 612 | 24 | 14 | 0 | 313 | 4 | 0 |
| 1000 | 12217 | 550 | 24 | 4 | 0 | 36 | 9 | 0 |
| 900 | 12365 | 601 | 26 | 4 | 0 | 32 | 2 | 0 |
| 800 | 12630 | 559 | 28 | 4 | 0 | 36 | 4 | 0 |
| 700 | 12714 | 412 | 24 | 4 | 0 | 36 | 4 | 0 |
| 600 | 12531 | 299 | 24 | 4 | 0 | 40 | 4 | 0 |
| 500 | 12407 | 352 | 24 | 4 | 0 | 42 | 2 | 0 |
| 400 | 12173 | 311 | 34 | 4 | 0 | 32 | 2 | 0 |
| 300 | 12121 | 301 | 24 | 4 | 0 | 36 | 4 | 0 |
| 200 | 12561 | 412 | 24 | 4 | 0 | 36 | 4 | 0 |
| 100 | 12501 | 478 | 24 | 4 | 0 | 36 | 2 | 0 |

```
                press CANCEL to quit -- Press NEXT PAGE to continue
```

Figure 4-9. Proceesor Occupancy Communication Measurement Report Screen

```
list measurements communications-links                                  Page 2
                                                Date:  1:55 pm  TUE JUL 31, 1990
                             COMMUNICATION LINK MEASUREMENTS
```

| Meas Hour | Link 9 | Link 10 | Link 11 | Link 12 | Link 13 | Link 14 | Link 15 | Link 16 |
|---|---|---|---|---|---|---|---|---|
| 0 | 12460 | 345 | 28 | 4 | 0 | 44 | 4 | 0 |
| 2300 | 12413 | 301 | 28 | 4 | 0 | 44 | 4 | 0 |
| 2200 | 12313 | 267 | 24 | 4 | 0 | 26 | 4 | 0 |
| 2100 | 12526 | 472 | 26 | 4 | 0 | 32 | 4 | 0 |
| 2000 | 12297 | 376 | 71 | 4 | 0 | 36 | 4 | 0 |
| 1900 | 12330 | 321 | 24 | 13 | 0 | 32 | 4 | 0 |
| 1800 | 12210 | 283 | 24 | 4 | 0 | 36 | 2 | 0 |
| 1700 | 12549 | 356 | 24 | 4 | 0 | 40 | 2 | 0 |
| 1600 | 12361 | 519 | 34 | 4 | 0 | 23 | 2 | 0 |
| 1500 | 12384 | 494 | 24 | 4 | 0 | 29 | 2 | 0 |
| 1400 | 12422 | 0 | 24 | 4 | 0 | 16 | 2 | 0 |
| 1300 | 12318 | 0 | 26 | 4 | 0 | 32 | 2 | 0 |

```
Command successfully completed
enter command:
```

Figure 4-10. Processor Occupancy Communication Measurement Report Screen

**It should be realized that the Processor Occupancy Communication Link Reports for each customer application will vary significantly since a particular link on one switch may serve a different function than the same link for another switch. Furthermore, what is considered to be normal link traffic for one service (for example, DCS) may vary widely from what is considered to be normal link traffic**

for another service (for example, CMS). Therefore, it is recommended that the customer obtain a printed report of what is deemed to be normal traffic (for each switch) and use that report for comparison purposes.

This report is of significant value in determining the long term impact that processor link traffic has on processor occupancy. The report can also be used to identify certain types of link failure (for example, total failure at 1400 hours on link 10 of Page 2). However, since the report summarizes data at 1-hour time intervals, some types of intermittent problems are not easily recognized with this report. Intermittent transmission problems may be more easily identified by reviewing the software error log.



Table 4-3. Communications Link Measurements Report

| Field | Description |
|---|---|
| Meas Hour | *Measurement Hour. The* starting time (using 24-hour clock) of the hour during which the data was recorded. Data is listed beginning with the most recently completed hour and preceding back for 24-hour intervals. |
| Link # | The links are identified by numbers 9 through 16. The numbers in each column represent the number of messages traversing the link. Once a link is established and traffic begins flowing over it, the messages are counted automatically; no command is required. |

# Mapping Links to Applications

Command

**To see what applications are running on the links, enter:**

display communications-interface links

Screen

**Figure 4-11 shows the applications used by each link for a sample configuration in which BX25 is using links 1, 2,3, and 8.**

**For a detailed explanation of this screen, refer to your *DEFINITY® Communications System Generic 3r—Implementation, 555-230-651* manual.**

```
display communication-interface links          5/13/91 Page 1 of 1   SPE A
                                     INTERFACE LINKS

                 Est      PI                Destination      DTE/
Link    Enable   Conn     Ext    Prot       Digits      Brd      DCE Identification
1:         n       y     200     BX25       160                  DTE
2:         n       y     201     BX25       276                  DTE cms link
3:         y       n     10      BX25       101                  DTE
4:         y       y     211     ISDN                   2B10         conn to v4d3
5:         y       y     216     ISDN                   2B14         conn to v4d3
6:         y       y     217     ISDN                   2B15         conn to v4d3
7:         y       y     218     ISDN                   2B05         dcs trnk 2 v5d1
8:         y       y     219     BX25                   2B05     DCE dcs link 2 v5d1
```

Figure 4-11. Proceseor Occupancy Interface Links Screen

# Data Analysis Guidelines

The following guidelines are intended to show an easy method for determining whether currently reported data is acceptable or not. These guidelines represent the minimum that you should do to verify that the recorded measurement values are consistent with expected and historic values. You should perform additional checks as necessary.

To check the acceptability of houtlfy data, verify that the system clock has not been changed during the measurement hour. If the system clock has been changed, the `Minutes` field will display double asterisks (for example, 11: **) and all other fields (for the indicated time interval) will display o.



During a partial system reset (for example, Warm, Cold 1, or Cold 2) the measurement data is retained for the affected time interval. However, during a full system reset (for example, 4 or 5) the measurement data is not retained for the affected time interval.

## Analyzing the Data

In order to calculate the measured BHCC, you should use the summary report to collect measurement data. Subsequently, you should record data for the identified peak hour on Worksheet 5. After recoding four weeks of data, you should calculate the column averages and record the averages in the appropriiate row and column at the bottom of Worksheet 5.

**NOTE:**
Before recording each day's data you should review the whole day in order to ensure that the peak hour is not the result of an abnormality (for example, caused by a snow storm, etc.). If you determine that the peak hour is the result of an abnormality, then you should disregard that day's data. Additionally, the weeks that you select to reed data from should NOT be times of slack business activity. Furthermore, the weeks should NOT be four consecutive weeks; but should be the weeks from two or more months of normal business activity.

Worksheet 5 in Appendix A provides space to record seven-day-per-week data. If the customers application is a five-day operation, then data should only be recorded for the five days (Monday through Friday). When averaging the data, care should be exercised to only divide by the number of days that data was actually recorded (for example, 20 or 28).

## Procedures for Calculating Processor Occupancy

Step 1. Is there available sufficient Processor Occupancy to grow the switch? If the sum of Call Processing Occupancy plus Static Occupancy is greater than 70 percent, there is no room to grow and no need to complete Steps 2 through 7. However, if the sum of Call Processing Occupancy plus Static Occupancy Stat Occ is less than 70 percent, continue with the following steps.

Step 2. Calculate the Usage Profile.

Use the four-week average data (which is obtained from your completed copy of Worksheet 5) to solve the following equations.

$$\% \ INTCOM = \frac{Int\ Atmpt}{Total\ Atmpt} \times 100$$

$$\% \ INC = \frac{Inc\ Atmpt}{Total\ Atmpt} \times 100$$

$$\% \ OUT = \frac{Out\ Atmpt}{Total\ Atmpt} \times 100$$

$$\% \ PNET = \frac{Pnet\ Atmpt - Tand\ Calls}{Total\ Atmpt} \times 100$$

**NOTE:**
Tand Calls is the number of Private Network tandem calls. This value is not provided on the report and should be estimated.

Step 3. Determine the Traffic Application.

Is the traffic application ICM/CMS, or CallVisor ASAI/OCM.

You can make this determination based on the type of business that is served by the switch, the percentages of incoming and outgoing traffic, and personal knowledge of which features are being used. For example, a General Business application will have a more even (in terms of incoming, outgoing, and intercom) distribution of traffic. An ICM/CMS application will have a high percentage of incoming calls and also provide those features which are specific to ACD or Call Vectoring. Some of these include agent and trunk tracking capability (for example, CMS or BCMS), recurring announcements, etc.

If the switch supports more than one traffic application (for example, ICM/CMS as the primary and General Business as the secondary), then the processor occupancy required for the primary application must be determined first and then the remainder is available for the secondary application.

**NOTE:**
This document describes the method for calculating the BHCC for a simple General Business traffic application. Those switches that provide the DCS, CMS, BCMS, and/or ISDN-PRI feature(s) are termed complex and the Design Center must be consulted in order to calculate their BHCC. All ICM (ACD and Call Vectoring), ASAI/OCM, and vectoring and interflow/traffic applications are also termed complex and currently are only evaluated by the National Engineering Center (NEC). The NEC requires certain input parameters (which are identified on Worksheet 6) before it can perform any evaluation.

Step 4. Determine the maximum number of calls the switch should be able to complete in one hour.

In order to make this determination, you should select the best match for the actual usage profile (the four percentage numbers that were calculated in Step 1) with the associated percentages provided under Usage Profile in Table 4-4. Once the best match has been determined, you can read across to the BHCC columns. Notice that the three columns under the BHCC heading correspond to different mixes of loading factors. Select the appropriate column and BHCC number.

**NOTE:**
The values for BHCC represent the maximum number of calls that the switch should be able to complete provided that the switch is used in the normal manner. The normal manner assumes that the users are not heavy feature users, that most attempted calls result in a completed call, and that calls complete in the same proportion as call attempts are made.

Step 5. Determine the normal calling rate for the given level of occupancy.

a. First, calculate how many completed calls the switch should be making for the given level of occupancy. This number is referred to as Calls predicted.

$$\text{Calls Predicated} = \frac{\text{Stat Occ} + \text{CP Occ}}{70} \times \text{BHCC}$$

**NOTE:**
1) The divisor number, 70, is the constant from Step 1 and refers to the percentage of the processor used by call processing.

2) The number for BHCC is the number that is obtained from Table 44 in Step 4.

b. Second, compare the Calls Predicted number to the four-Week average Total Calls field on Worksheet 5.

$$\textit{Calls Predicted} < \textit{Total Calls}$$

*or*

$$\textit{Calls Predicted} > \textit{Total Calls}$$

If the Calls Predicted number is less than the Total Calls number, then either the customer has a low feature usage rate or is completing more than 70 percent of calls. Therefore, if additional capacity is used in the same way, the following predictions should provide reliable results.

If the Calls Predicted number is greater than the Total Calls number, then either the customer has a high feature usage rate or is completing less than 70 percent of calls. Therefore, care must be taken in predicting how many additional calls can be supported.

If the Calls Predicted number equals or approximately equals the Total Calls number then the customer is using the switch in a typical manner.

Step 6. Determine how many additional calls the switch can complete.

The number of additional calls can be calculated with the following equation.

$$\textit{Number of Additional Calls} = \frac{\textit{Total Calls (4 Week Avg)}}{\textit{Stat Occ} + \textit{CP Occ}} \times (\textit{Idle Occ} - 15)$$

Step 7. Determine how many additional extensions can be added.

$$\textit{Additional Extensions} = \frac{\textit{Number of Additional Calls}}{\textit{Average Number of Calls per Extension}}$$

**NOTE:**
The Average Number of Calls per Extension depends on the traffic application and other customer-specific operating techniques. If this measurement is not known, then you may use 4.05 (which is a typical figure for a General Business traffic application).

Table 4-4. Maximum BHCC for Several User Configurations

| Usage Profile | | | | BHCC | | |
|---|---|---|---|---|---|---|
| % INTCOM | % INC | % OUT | % PNET | No Loading Factors | SMDR | SMDR & AUDIX |
| 34 | 33 | 33 | 0 | 10000 | 9100 | 7300 |
| 10 | 10 | 80 | 0 | 9400 | 8100 | 7600 |
| 10 | 80 | 10 | 0 | 11000 | 9700 | 7300 |
| 25 | 25 | 25 | 25 | 10600 | 9300 | 7600 |
| 16 | 17 | 17 | 50 | 11100 | 9600 | 8000 |
| 10 | 10 | 10 | 70 | 11600 | 9800 | 8200 |

The maximum usage cofigurations depicted in Table 4-4 and listed by order are as follows:

Standard usage without private networking (for example, 34% INTCOM, 33% INC, 33% OUT, 0% PNET)

Heavy outgoing usage without private networking

Heavy incoming usage without private networking

Standard usage with light private networking

Standard usage with medium private networking

Standard usage with heavy private networking

**NOTE:**
This mix assumes usage of 40 percent analog stations, 20 percent Digital Communications Protocol (DCP) non-display stations, and 40 percent DCP display stations.

# Automatic Transmission Measurement System (ATMS)

# 5

5

## Background Information

The Automatic Transmission Measurement System (ATMS) allows voice and data trunk facilities to be measured for satisfactory transmission performance. The trunks are evaluated using a series of analog tests and comparing the results to user-defined threshold values.

The report contains data on trunk signal loss, noise, singing return loss, and echo return loss. Users see individual trunk measurements from the most recent test entries.

The number of pages of each report is dependent upon the selection criteria and the number of outgoing trunks in the system. About 10 measurements can be listed on a page on the administration terminal, or about 50 measurements can be listed on a printer.

This report supports either a large tandem switch (4,500 trunks)or a large non-tandem switch (2,250 trunks).

By default, reports list all measurements. Filtering can be used to limit the output. For example, the report can be setup to print only failed measurements.

For information on the kinds of measurements that can be reported on different Terminating Test Lines (TTLs), refer to the *DEFINITY Communications" System Genetic 3r Maintenance, 555-230-105.* For a further description of ATMS, refer to *DEFINITY Communications System Generic 1 and Genetic 3 Feature Description, 555-203-201.*

Command

**There are two basic commands. One produces a measurements detail report and one produces a measurements summary report.**

**The commands are:**

1. list testcalls detail [grpx*][to-grp x][mem xj[to-mem x] port x][result X] ¦ [not-result x][count x][print or schedule].[1]
2. list testcalls summary [grp x][to-grp x][count x][print] or [schedule].

Options: **The "count" and "print/shedule" options are available for this command. The 'count" option limits the number of records displayed or printed. The "print" option allows you to print the report to the system printer immediately; the "schedule" option allows you to schedule when the report will be printed.**

**Following are examples of some commands:**

**To list all trunks measurements in the system, enter:**

list testcalls detail

**To list measurements for a particular trunk circuit, enter:**

list testcalls detail **port 01BO1O1 To list measurements in trunk groups 1 to 10 that match trunks with marginal threshold values, enter:**

list testcalls detail grp 1 to-grp 10 result marg

**To list all measurements that do not have "pass" as a result code, enter:**

list testcalls not-result pass

1. **The letter x represents a valid number or test result.**

# ATMS Detail Report

**This two-section report assists in analyzing trunk measurements. When a marginal or unacceptable measurement is located, you can immediately scan the top section to find out how far the measurement deviates from its defined threshold. You need not exit the report to compare a bad measurement against threshold information from another screen. By interacting with the trunk group form, it highlights out-of-tolerance measurements. Unusable trunk members blink, allowing you to identify quickly out-of-tolerance or unusable trunks.**

## Screen

**Figure 5-1 shows a typical screen for the ATMS Detail Report. The report is divided into two sections. The upper section lists the trunk group, TTL type, trunk vendor, and the user-defined threshold values. The lower section lists the trunk measurements selected for the report. Table 5-1 describes the data presented in the ATMS Detail Report.**

```
                         ATMS TRUNK MEASUREMENTS
Group: 78  Type: co     Vendor: AT&T                    TTL Type: 105-w-rl

THRESHOLD VALUES
                                          Loss dev at
                     1004Hz-loss  404Hz 2804Hz  C-msg C-ntch    SRL  SRL
                       Min  Max   -  +  -  +   Noise Noise     LO   HI  ERL
            Marginal   -2   21    9  9  9  9    55    74       0    0   0
        Unacceptable   -2   21    9  9  9  9    55    74       0    0   0
Trk Test  Test  Test -16dBm OdBm
Mem Date  Time  Rslt FE NE  FE NE  FE NE FE NE  FE NE FE NE  FE NE FE NE FE NE
1   10/04 14:25 pass 7  7   7  7   -2 -2 7  7   15 28 34 34  8  16 11 16 11 17
2   10/04 14:26 1920
3   10/04 14:27 1000
4   10/04 14:28 pass 7  7   7  7   -2 -2 7  7   15 29 38 34  8  16 11 15 11 16
5   10/04 14:29 pass 7  7   7  7   -2 -2 6  6   15 35 34 34  8  6  9  6  10 7
6   10/04 14:30 pass 7  7   7  7   -2 -2 6  6   15 26 34 34  8  16 9  13 10 16
7   10/04 14:31 pass 7  7   7  7   -2 -2 7  7   15 30 34 34  8  16 9  11 10 13
8   10/04 14:32 pass 6  6   6  6   -2 -2 6  6   15 25 34 34  10 17 11 16 12 17
9   10/04 14:33 pass 6  6   7  7   -1 -1 7  7   15 25 34 34  8  15 9  13 10 16
10  10/04 14:34 pass 6  6   7  6   -1 -1 7  7   15 36 34 35  8  6  9  6  10 7
```

Figure 5-l. ATMS Detail Report Screen

Table 51. ATMS Detail Report

| Field | Description |
|---|---|
| Group | The trunk group number selected. |
| Type | The trunk group type. |
| Vendor | The vendor of this trunk group. |
| TTL Type | The kind of test line for this trunk group. Test line types usually determine which measurements are displayed. However, the user has the option of specifying which tests are run and can thereby limit the measurements which are gathered. Refer to Transmission Test Options," below. |
| Threshold Values | The list of marginal and uacceptable threshold values defined on the trunk group form. |
| Trk Mem | Trunk Member. The trunk member within the trunk group. |
| Test Date | The month and day this trunk was tested. |
| Test Time | The time of day this trunk was tested. |
| Test Rslt | Test Result. A description of the results of the trunk transmission test.<br><br>The values for this field may range from -9 to 99, or the field maybe blank. If the field is blank, it means no measurements were made.<br><br>Measurements are listed in ascending trunk member order for each trunk group. If a trunk group changes, a new page is generated with each of the trunk group members in ascending order. |
| 1004Hz Loss at 16dBm | The far-to-near and near-to-far measurements of 1004-HZ loss from low-level tone. |
| 1004Hz Loss at 0dBm | Far-to-near and near-to-far measurements of 100r-Hz loss at 0dBm. |
| Loss Dev at 404Hz | Transmission tests at low frequency. These tests measure a maximum positive and negative deviation of +9 and -9 dB from the 1004-HZ loss measurements. |

*Continued on next page*

Table 5-1. ATMS Detail Report (Continued)

| Field | Description |
|---|---|
| Loss Dev at 2804Hz | Transmission tests at high frequency. These tests measure a maximum positive and negative deviation of +9 and -0dB from the 1004-Hz loss measurements. |
| C-msg Noise | Maximum noise interference (in dBmC above reference noise) terminating on a voice terminal within the voice-band frequency range (500 to 2500 Hz) between 15 and 55dBmC. |
| C-ntch Noise | Maximum signal-dependent noise interference on a line between 34 and 74 dBmC. |
| SRL-LO | Singing return loss from 0 to 40 dB between the sum of the circuit (repeater) gains and the sum of the circuit losses. SRL-LO occurs most often in the frequency range of 200 to 500 Hz. |
| SRL-HI | Singing return loss fro 0 to 40 db between the sum of the circuit (repeater) gains on a circuit and the sum of the circuit losses. SRL-HI occurs most often in the frequency range of 2500 to 3200 Hz. |
| ERL | Echo return loss from 0 to 40 dB between the level of signal strength transmitted and the level of signal strength reflected. ERL occurs most often in the frequency range of 500 to 2500 Hz. |

## Transmission Test Options

Although the test line type usually determines which measurements are displayed, the user has the option to specify which tests are run and can thereby limit the measurements which are gathered. The test options that affect those measurements are:

- Supervision tests
- Full transmission tests
- Full transmission without return loss. (You can only run this test with type 105 TTLs.)

The ATMS report does not show these transmission tests, nor are they shown as fields due to space considerations. The following table tells you how your report will look if these tests have been run:

| Test Type | Result/Explanation |
|---|---|
| No test | If a trunk has not been tested, the measurement fields contain blanks and the “Tst Rslt”, “Test Time’ and “Test Date” fields are blank. |
| Aborted Test | If an error prevents a trunk from being tested, the measurement fields contain blanks. The “Tst Rslt” field contains the error code number and the “Test Time” and “Test Date” fields show the test execution time. |
| Supervision Test | If this test was run, the measurement fields contain blanks, the “Test Time’ and ‘Test Date” fields show the test execution time, and the “Tst Rstt” field contains the string “pass.” |
| Full Test | If this test was run, the measurement fields contain data appropriate for the TTL type. Table 5-2, which follows, describes the measurements generated by each TTL type. The “Test Time” and “Test Date” fields show the test execution time. |
| Full Test w/o Return Loss | If this test was run, all measurement fields contain data except “SRL-LO,” “SRL-HI,” and “ERL.” The “Test Time” and “Test Date” fields show the test execution time. |

Table 5-2. Measurement Capability by TTL Type

ATMS Test Measurement Capability

| Test | Terminating Test Line Type: 105 Type with Return Loss | 105 Type without Return Loss | High-level/ Low-level Tone Source | 100 Type | 102 Type |
|---|---|---|---|---|---|
| 1004 Hz Loss Far-End to Near-End | x | x | x | | |
| 1004 Hz Loss Near-End to Far-End | x | x | | | |
| 404 Hz Loss Far-End to Near-End | x | x | | | |
| 404 Hz Loss Near-End to Far-End | x | x | | | |
| 2804 Hz Loss Far-End to Near-End | x | x | x | | |
| 2804 Hz Loss Near-End to Far-End | x | x | | | |
| C-Message Noise Near-End | x | x | | x | |
| C-Message Noise Far-End | x | x | | | |
| C-Notched Noise Near-End | x | x | | | |
| C-Notched Noise Far-End | x | x | | | |
| Return Loss* Near-End | x | x | x | x | |
| Return Loss† Far-End | x | | | | |

* Return Loss includes Singing Return Loss High Frequency, Singing Return Loss Low Frequency, and Echo Return Loss.

† This table does not include self-test nor does it distinguish between measurements for different test tone levels.

Measurements that marginally exceed a threshold value will be highlighted. This means a trunk is usable but is unsatisfactory in terms of noise, loss, or echoes.

Measurements that exceed a threshold by an unacceptable amount will be blinking. This means the trunk is unusable. Usually, such trunks have been removed from service but there are exceptions:

- The trunk may have been returned to service manually
- The maximum number (or percent) of trunks allowed out of service may have been reached
- The maintenance parameter field on the trunk group threshold page may be set to "no"
- The threshold values may have been changed since the test was completed. If these values were set to more restrictive levels, trunks which passed the last test will now test as unacceptable.

Unless qualifiers are specified on the command line, every trunk group member is displayed, regardless of whether error conditions exist. However, no measurements are collected when error conditions are encountered during transmission testing. Where error conditions prevent a test call from collecting measurements, the reason for the failure is displayed in the "Tst Rslt" field, as shown below:

| Test Result | Explanation |
|---|---|
| pass | Measurements are satisfactory |
| marg | Measurements exceeded the marginal thresholds |
| fail | Measurements exceeded the unacceptable thresholds |
| xxxx | Error abort code |
| " " | Blank values indicate a test was not performed |

**NOTE:**
The error abort codes are in your DEFINITY Maintenance manual.

## ATMS Summary Report

The ATMS Summary Report summarizes, on a trunk group basis, the collective results of the latest ATMS tests performed on each trunk group. By interacting with the trunk group form, it highlights out-of-tolerance measurements. Unusable trunk members blink, allowing you to identify quickly out-of-tolerance or unusable trunks.

Screen

Figure 5-2 shows a typical screen for the ATMS Measurement Summary Report. Table 5-3 describes the data fields presented in the ATMS Measurement Summary Report.

ATMS MEASUREMENT SUMMARY REPORT

| trk Grp Num | Num of Trks | Last Test Date | Last Test Time | Trunks Passed Transm Test | Trunks Failed Marginal Threshld | Trunks Failed Unaccept Threshld | Trks In-Use | Trks Not Test | Busied Out Trunks |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 10 | 10/04/91 | 15:15 | 10 | 0 | 0 | 0 | 0 | 0 |
| 10 | 10 | 10/04/91 | 15:40 | 10 | 0 | 0 | 0 | 0 | 0 |
| 20 | 5 | 10/04/91 | 16:00 | 5 | 0 | 0 | 0 | 0 | 0 |
| 30 | 30 | | | 0 | 0 | 0 | 0 | 30 | 0 |
| 40 | 20 | 10/04/91 | 16:15 | 20 | 0 | 0 | 0 | 0 | 0 |
| 50 | 10 | 10/04/91 | 16:40 | 10 | 0 | 0 | 0 | 0 | 0 |
| 60 | 3 | 10/04/91 | 16:55 | 0 | 0 | 0 | 0 | 0 | 3 |
| 78 | 10 | 10/04/91 | 17:05 | 8 | 0 | 0 | 1 | 0 | 1 |
| 83 | 15 | 10.04/91 | 17:20 | 15 | 0 | 0 | 0 | 0 | 0 |
| 105 | 100 | 10/04/91 | 17:40 | 100 | 0 | 0 | 0 | 0 | 0 |
| 125 | 2 | 10/04/91 | 19:30 | 0 | 0 | 0 | 0 | 0 | 2 |
| 350 | 10 | 10/04/91 | 19:40 | 10 | 0 | 0 | 0 | 0 | 0 |
| 500 | 55 | 10/04/91 | 19:55 | 55 | 0 | 0 | 0 | 0 | 0 |
| 650 | 1 | 10/04/91 | 21:00 | 1 | 0 | 0 | 0 | 0 | 0 |

Figure 5-2. ATMS Measurement Summary Report Screen

Table 5-3. ATMS Measurement Summary Report

| Field | Description |
|---|---|
| Trk Grp Num | The trunk group number being summarized. Only outgoing to two-way analog trunks will be listed. |
| Num of Trks | The total number of members per trunk group. |
| Last Test Date | The date of the oldest measurement in the trunk group. |
| Last Test Time | The time of the oldest measurement in the trunk group. |
| Trunks Passed Transm Test | The number of trunks that have passed the trunk transmission tests. |
| Trunks Failed Marginal Threshld | The number of trunks that failed a marginal threshold, but not an unacceptable threshold according to the threshold values defined on the trunk group form. |
| Trunks Failed Unaccept Threshld | This is taken from the unacceptable threshold administered on the trunk group form. |
| Trks In-Use | The number of trunks that were in-use at the time of testing. Currently the abort codes for Trunks In-Use are 1000 and 1004. |
| Trks Not Test | Refer to your Maintenance manual for list of possible error conditions. Currently the abort codes for Trunks Not Tested are all references, except 1000 and 1004 which are used for Trunks In-Use. |
| Busied Out Trunks | The number of trunks that were busied out at the time. This could be due to hardware problems, incorrect threshold values, etc. |

## Measurement Analysis

ATMS compares the results of the test measurements with threshold values to identify trunks that are out of tolerance or unusable. Once a defective circuit has been pinpointed, a proper analysis must be made to determine the appropriate action to take on the facility failures. Although there is no “right” procedure for every situation, the following items will help in troubleshooting problems:

- If a circuit fails an ATMS transmission test, it does not necessarily mean the trouble is in the facility itself. The problem could be caused by a faulty test line, bad switch path, or a variety of other reasons.
- If a circuit fails a transmission test but successfully passes a supervison test, some of the items mentioned above are probably not at fault, since proper call routing and circuit continuity are required for successful of a supervision test.
- If several circuits in the same group are failing, this could indicate the failure of some common equipment (such as a carrier system, test line, or cable) or erroneous information in the threshold tables.
- When a test call can be successfully made, but not completed, either the OTL or TTL is probably defective For this failure type, further ATMS testing might be seriously impaired, but the system is not otherwise affected.
- If a test call cannot bessuccessfully made, the wrong number might have been dialed, the far-end device might be busy, the far-end device is defective, or there is a serious trunk failure obstructing the call.

# Security Violations Reports

# 6

This section describes the Security Violations Reports. There are three reports-two sub-reports and a status report. The sub-reports show any system management login, security measurement, authorization code security measurements, and remote access barrier code attempts.

## Background Information

To effectively monitor the security of your system, it's important to ascertain how many valid and invalid attempts at system entry are normally made; otherwise, you won't know when the number of attempts becomes significantly high. A significant increase in such attempts can mean the system is being compromised. It is recommended that the security measurements reports be printed and cleared at least once a month. In a busy system, these tasks should be performed more frequently. (Once a week is not too frequent.)

For example, you may determine that during a one week period, it's normal to submit about 1,000 valid barrier codes and 150 invalid codes; that is, about 3.75 invalid barrier codes are submitted per hour. With this information in hand, you may adminster the Security Violation Notification so it is generated during any hour in which eight invalid barrier codes are submitted. If you know that during an eight-hour period, about 30 invalid codes are submitted, you might set the threshold to generate a Security Violation Notification if 40 codes are submitted within eight hours. (The thresholds are administered on the System-Parameters Features Form.)

Information about invalid login attempts is collected at two levels:

- On an immediate basis, when an invalid login attempt or remote access barrier code attempt is made, the Security Violations Notification (SVN) feature can be used to send a priority call to a designated referral point (attendant console or station equipped with a display module) so that there is some chance of apprehending the violator during the attempted violation. Upon notification, the security administrator can request the Security Violations Status Report which will show details of the last sixteen security violations of each type.
- On a historical basis, the number of security violations, as well as other security measurements, of each type are collected and reported in the two Security Violations Sub-Reports. These reports shows summary information since the last time that the counters were reset by the clear *measurements security-violations* command or since system initialization. They do not show details of the individual security violations.

The two Security Violations Sub-Reports are:

1. Security Violations Summary.
2. Security Violations Detail.

The Security Violations Status Report and the Security Violations Sub-Reports are available in all systems without special prerequisites.

# Security Violations Summary Sub-Report

The system generates a Security Violations Summary Sub-Report that -among other measurements_ identifies the port-types from which invalid login attempts, invalid barrier code attempts and invalid authorization code attempts are made. This is a historical report showing summary information since the last time that the counters were reset. The system monitors the following ports:

- System administration terminal connected within 50 feet of the system cabinet
- AT&T Customer Support Service Organization (CSSO).
- Dial-up ports which use the switch fabric. These are normally used by Csso.
- Expansion Port Networks (EPN) Maintenance Ports. These ports are typically used as local connections by services for onsite maintenance.

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## Commands

Commands are available for displaying and clearing the Security Violations Sub-Reports. To display the reports, enter:

list measurements security-violations summary/detail [print] or [schedule]

To reset all counters of the Security Violations Sub-Reports to zero, enter:

clear measurements security-violations

**NOTE:**
The Security Violations Summary Sub-Report accumulates data until it is cleared. This report *will* overflow; therefore, it should be reviewed and cleared at least once a month.

Options: The options print and schedule apply to these reports.

## Screen

Figure 6-1 is a typical screen for the Security Violations Summary Sub-Report. The date and time the report was requested are displayed to the right, above the title of the report. Table 6-1 describes the data presented in the Security Violations Summary Sub-Report.

```
list measurements security-violations summary
Switch Name:  Customer-Switch               Date: 12:55 pm MON OCT 21, 1991
                      SECURITY VIOLATIONS SUMMARY REPORT
                    Counted Since: 9:42 am TUE OCT 15,1991
       Barrier Codes                      Authorization Codes
                   Security         Originator       Valid   Invalid
 Valid    Invalid  Violations       Station            0       0
   0         0        0             Trunk              0       0
                                    Remote Access      0       0
                                    Attendant          0       0
                                     Total             0       0
          Successful   Invalid   Invalid    Forced     Login Security   Trivial
Port Type   Logins     Attempts    IDs    Disconnects    Violations     Attempts
SYSAM-LCL     10          0         0          0              0             0
SYSAM-RMT     18          1         0          0              1             2
MAINT          0          0         0          0              0             0
SYS-PORT     243         15         0          4              7             2
 Total       271         16         0          4              8             4
Command successfully completed
```

Figure 6-l. Security Violations Surnmary Sub-Report Screen

Table 6-1. Security Violations Summary Sub-Report

| Field | Description |
|---|---|
| Counted Since | The time at which the counts above were last cleared and started accumulating again, or when the system is initialized. |
| Barrier codes | |
| Valid | The total number of times a user submitted a valid remote access barrier code. Barrier codes are used with remote access trunks. An inexplicable, significant increase in valid barrier codes could mean the barrier code has already been compromised. |
| Invalid | The total number of times a user submitted an invalid remote access barrier code. Barrier codes are used with remote access trunks.<br><br>A marked increase in this number may indicate someone is attempting to break into your system. If you have just distributed a new password, it may mean people are making honest mistakes.<br><br>Suggested Action: Change the barrier code if you suspect it has been compromised. |
| Security Violations | The total number of security violation notifications generated because too many invalid barrier codes were submitted in a given amount of time.<br><br>You can define the meaning of a barrier security violation by setting two parameters administratively:<br>1. The number of invalid barrier codes submitted<br>2. The time interval.<br><br>A remote access security violation notification is sent to the attendant console or a station with a display when the number of invalid barrier codes is exceeded within the administered interval of time. |

*Continued on next page*

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Table 6-1. Security Violations Summary Sub-Report (Continued)

| Field | Description |
|---|---|
| Authorization code Measurments Originator | The type of resource originating the calls that generated the valid/invalid authorization codes measured. Originators may be:<br>■ Station<br>■ Trunk (other than remote access)<br>■ Remote Access<br>■ Attendant<br>■ Total (of all types above) |
| Valid | The total number of valid authorization codes originating from the designated originator type.<br><br>Suggested Action: If the total of valid authorization codes increases dramatically, you should inquire. Someone may have obtained valid codes; on the other hand, it may turn out that a number of new, legitimate users have come onto the system. If you suspect Authorization Codes have been compromised, change them. |
| Invalid | The total number of invalid authorization Codes originating from the designated originator type.<br><br>The valid and invalid code counts are provided so you can see their relationship.<br><br>Suggested Action: If the total of invalid authorization codes increases dramatically, you should inquire. Someone may be trying to break into your system. However, a legitimate explanation may be that authorization codes have recently been changed and users are making some honest mistakes. If you suspect Authorization codes have been compromised, change them. |

*Continued on next page*

Table 6-1. Security Violations Summary Sub-Report (Continued)

| Field | Description |
|---|---|
| system Managanent Login Measurements | The type of port used by the measured login process. If break-ins are occurring at this level, the offender may have access to your system administration. This is an extremely dangerous situation. Port types can be: |
| Port Type | ■ *SYSAM-LCL (SYSAM Local Port.):* This port on tie SYSAM board is typically used as the local connection to the G3-MT. It is located in the switch room.<br>■ *SYSAM-RMT (SYSAM Remote Port.):* The dial-up port on the SYSAM board is typically used by services for remote maintenance and is also used by the switch to call out with alarm information. If system break-ins are being made or attempted using this port, the offender would be someone who has the dial-up number.<br>■ *MAINT: These ports* on the Expansion Port Networks maintenance boards are typically used as local connections for onsite maintenance performed by services. If system break-ins are being made or attempted using this port, the offender would be someone who works in the building.<br>■ *SYS-PORT (System Ports):* These ports are accessed by dial-up through the TDM bus. |
| Total | Measurements totaled for all the above port types. |
| Successful Logins | The total number of successful logins into SM (i.e., the login ID and the password submitted were valid) for the given port type. |

Continued on next page

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Table 6-1. Security Violations Summary Sub-Report (Continued)

| Field | Description |
|---|---|
| `Invalid Login Attempts` | **The total number of login attempts where the attempting party submitted an invalid login ID or password while accessing the given port type.**<br><br>**NOTE:**<br>**Look for numbers that are significantly higher than normal.**<br><br>**Invalid attempts do not include cases where a user makes several attempts to logon and is successful on the second or third attempt. (A user is given three tries at logging on before being disconnected.)** |
| `Invalid Login IDs` | **The total number of unsuccessful login attempts where the attempting party submitted an invalid login while accessing the given port type.**<br><br>**NOTE:**<br>**Invalid break-in attempts which mostly involve invalid IDs are likely to be made by someone outside the organization; that is, someone who does not know a valid ID.**<br><br>**Break-ins where most invalid attempts involve invalid passwords, are likely to be made by someone inside the organization. That is, if a significant increase in invalid *passwords* occurs without a preceding increase in invalid *IDs, the* person attempting to break in already knows a valid ID.** |

***Continued on next page***

Table 6-1. Security Violations Summary Sub-Report (Continued)

| Field | Description |
|---|---|
| Login Forced Disconnects | The total number of login processes that were disconnected automatically by the switch because the threshold for conseoutive invalid login attempts had been exceeded for the given port type. The threshold is three attempts. |
| Login security Violations | The total number of login security violations for the given port type.<br><br>As with barrier code attempts, the user can define the meaning of a security violation by setting two parameters administratively:<br>1. the number of unsuccessful logins<br>2. the time interval.<br><br>A login security violation notification is sent to the attendant console or a station with a display when the number of unsuccessful logins is exceeded within the administered interval of time. |
| Login Trivial Attempts | The total number of times a user connected to the system and gave no input to the login sequence. A large number of trivial attempts could mean that the dial-up numbers have been accidentally distributed to the wrong personnel. |

# Security Violations Detail Sub-Report

**The Security Violations Detail Sub-Report provides system management login data per login identification. It relates only to system administration.**

## Screen

**Figures 6-2 to 6-5 are typical screens for the Security Violations Detail Sub-Report. Table 6-2 describes those data fields presented in the Security Violations Detail Sub-Report that are unique to it. The others will be found in Table 6-1.**

```
list measurements security-violations detail                 Page 1  SPE A
Switch Name: Definity G3 In-House            Date: 1:21 pm MON OCT 21, 1991
                        SECURITY VIOLATIONS DETAIL REPORT
                   Counted Since: 9:42 am TUE OCT 15, 1991
                     Successful    Invalid
Login ID  Port Type    Logins     Passwords
init      SYSAM-LCL      6           0
          SYSAM-RMT      0           0
          MAINT          0           0
          SYS-PORT     191           3
           Total       197           3
inads     SYSAM-LCL      0           0
          SYSAM-RMT     11           1
          MAINT          0           0
          SYS-PORT      22           1
           Total        33           2
               press CANCEL to quit -- press NEXT PAGE to continue
```

Figure 6-2. Security Violations Detail Report Screen

```
list measurements security-violations detail                         Page 2  SPE A
Switch Name: Definity G3 In-House                   Date: 1:21 pm MON OCT 21, 1991
                        SECURITY VIOLATIONS DETAIL REPORT
                   Counted Since: 9:42 am TUE OCT 15, 1991
                            Successful    Invalid
Login ID  Port Type           Logins       Passwords
system technician    SYSAM-LCL        3             0
          SYSAM-RMT        0            0
          MAINT            0            0
          SYS-PORT         0            2
           Total           3            2
cust      SYSAM-LCL        1            0
          SYSAM-RMT        0            0
          MAINT            0            0
          SYS-PORT        33            4
           Total          34            4
          press CANCEL to quit -- press NEXT PAGE to continue
```

Figure 6-3. Security Violations Detail Report Screen

6

```
list measurements security-violations detail                         Page 3  SPE A
Switch Name: Definity G3 In-House                   Date: 1:21 pm MON OCT 21, 1991
                        SECURITY VIOLATIONS DETAIL REPORT
                   Counted Since: 9:42 am TUE OCT 15, 1991
                            Successful    Invalid
Login ID  Port Type           Logins       Passwords
rcust     SYSAM-LCL        0            0
          SYSAM-RMT        0            0
          MAINT            0            0
          SYS-PORT         0            1
           Total           0            1
nms       SYSAM-LCL        0            0
          SYSAM-RMT        0            0
          MAINT            0            0
          SYS-PORT         0            1
           Total           0            1
          press CANCEL to quit -- press NEXT PAGE to continue
```

Figure 6-4. Security Violations Detail Report Screen

```
list measurements security-violations detail                     Page 3  SPE A
Switch Name: Definity G3 In-House           Date: 1:21 pm MON OCT 21, 1991
                        SECURITY VIOLATIONS DETAIL REPORT
                     Counted Since: 9:42 am TUE OCT 15, 1991
                       Successful    Invalid
Login ID  Port Type      Logins     Passwords
bcms      SYSAM-LCL        0           0
          SYSAM-RMT        0           0
          MAINT            0           0
          SYS-PORT         0           1
           Total           0           1
browse    SYSAM-LCL        0           0
          SYSAM-RMT        7           0
          MAINT            0           0
          SYS-PORT         3           2
           Total          10           2
Command successfully completed
```

Figure 6-5. Security Violations Detail Report Screen

Table 6-2. Security Violations Detail Sub-Report

| Field | Description |
|---|---|
| **Login ID** | **The login identification submitted bythe party attempting to login. Login IDs include the vaild system login IDs.** |
| **Invalid Passwords** | **The total number of login attempts where the attempting party submitted an invalid password for the given port type and login ID.** |

**NOTE:**

**If you see a large number of invalid attempts where an invalid ID is used, whoever is trying to break in doesn't kwow a valid ID. On the other hand, if no invalid IDs are being used, whoever is trying to break in does know the ID. Review the Valid ID attempts to see which ones had invalid passwords connected with them.**

## Status Report

The Security Violations Status Report provides current status information for invalid system administration terminal login or Remote Access (barrier code) attempts. Invalid system administration terminal login attempts will log the time the violation occurred, the login entered, and the port that was accessed during the failed login attempt. Invalid barrier code attempts will log the time the violation occurred, the number of the trunk group that was accessed, the trunk group member number, and the Remote Access extension. A total of 16 entries will be maintained for each type of invalid access (login or remote access). The data displayed by the monitor command is refreshed every 30 seconds.

**NOTE:**
It is important to study the Security Violations Summary Report over a period of time so thresholds can be set appropriately. Refer to “Background Information” earlier in this chapter.

For further information, refer to the *DEFINITY® Communications System Genetic 3r—Implementation, 555-230-651* manual.



### Command

To display the Security Violations Status Report, enter

```
monitor security-violations [print]
```

Options: **The print option is available for this command.**

Screen

**Figure 6-6 is a typical screen for the Security Violations Status Report. The date and time the report was requested are displayed to the right, above the title of the report. Table 6-3 describes the data fields presented in the Security Violations Status Report.**

```
monitor security-violations                                                    SPE A
                                                      Date: 4:25   FRI MAY 18 1990
                                  SECURITY VIOLATIONS STATUS
     SYSTEM MANAGEMENT VIOLATIONS                   REMOTE ACCESS VIOLATIONS
Time           Login      Port               Time          TG No       Mbr   Ext
05/04 15:22    testid     SYS-PORT           05/03 21:14     3          50   81111
05/04 15:23    testit     SYS-PORT           05/04 22:10    21          43   83333
05/04 15:25    testx      SYS-PORT           05/04 22:13    21          43   83333
05/05 04:30    aaaaaaaa   SYS-PORT           05/04 22:15    21          43   83333
05/05 04:31    aaaaaaab   SYS-PORT
05/05 04:33    aaaaaaac   SYS-PORT
05/05 10:21    root       MAINT
05/05 10:22    root       MAINT
05/05 10:23    root       MAINT
05/05 11:45    init       SYSAM-LCL
05/05 11:46    init       SYSAM-RMT
05/05 11:48    init       SYSAM-RMT
Command successfully completed
enter command:
```

Figure 6-6. Security Violations Status Report Screen

Table 6-3. Security Violations Status Report

| Field | Description |
|---|---|
| `Date: and Time` | The date and time of the invalid login attempt. |
| `Login` | The login ID used in the invalid login attempt. The failure may have been due to an invalid password, but the login (valid or not) is listed. |
| `Port` | The port on which the invalid login attempt was made. The following abbreviations are used:<br>■ SYSAM-LCL (SYSAM Local Port.): This port on the SYSAM board is typically used as the local connection to the G3-MT. It is located in the switch room.<br>■ SYSAM-RMT (SYSAM Remote Port.): The dial-up port on the SYSAM board is typically used by services for remote maintenance and is also used by the switch to call out with alarm information.<br>■ MAINT: These ports on the Expansion Port Networks maintenance boards are typically used as local connections for onsite maintenance performed by services.<br>■ SYS-PORT (System Ports): These ports are accessed by dial-up through the TDM bus. |
| `Date and Time` | The date and time of the remote access attempt. |
| `TG No.` | The trunk group number associated with the trunk used in the invalid remote access attempt. |
| `Mbr` | The trunk group member number of the trunk used in the invalid remote access attempt. |
| `Ext` | The Remote Access extension.<br>Suggested Action:<br>1. For login security violations where the port is known, busy it out to restrict access. If it can be determined to which login access is being attempted, change the password for that login.<br>2. For Remote Access violations, change the remote access barrier code and the remote access extension. |

# References

# 7

The following is an abbreviated listing of relevant DEFINITY® Communications System documents. Included is a brief description of each document in the list. User instructions are also available for all terminals used with the systems.

To order copies of any of these documents, refer to the address on the back of the title page.

**Business Communications Systems Publications Catalog** 555-000-010

Provides a list of publications that support AT&T business communications systems. Also provides a brief description of each publication listed.

**DEFINITY® Communications System and System 75 and System 85—Terminals and Adjuncts-Reference** 555-015-201

Provides concise physical and functional descriptions of the peripheral equipment that can be used with DEFINITY Generic 1, DEFINITY Generic 2, System 75, and System 85. It is intended as an aid for both AT&T and customer personnel in selecting appropriate components for these systems and in training and management.

**DEFINITY® Communications System and System 75 and System 85—DS1/DMi/ISDN-PRI—Reference** 555-025101

Provides a broad but detailed description of the DS1 Tie Trunk Service, DMI, and ISDN-PRI features. Introduces and defines concepts and terminology unique to DS1, DMI, and ISDN-PRI. Also includes applications, engineering procedures and considerations, cabling and connection arrangements, administration requirements, restrictions and limitations, etc.

**DEFINITY® Communications System Generic 1 and Generic 3—Feature Description** 555-230-201

Provides a technical description of the system features and parameters. For each feature, the following information is provided:

- Limitations/considerations
- Feature interactions
- Administration requirements
- Hardware and software requirements

**DEFINITY® Communcations System Generic 1 and Generic 3—Console Operations** 555-230-700

Provides "how-to-operate" instructions for the attendant console. Serves as a reference when defining the console control keys and Incoming Call Identification requirements.

**DEFINITY® Communications System Generic 1 and Generic 3—Voice Terminal Operations** 555-230-701

Describes all the voice features and provides the "how-to-operate" instructions for each voice terminal. Serves as a training guide for system users.

**DEFINITY— Communications System Voice Terminal Doou- Master Kit** 555-230-750

A multi-element kit for end-users to provide them with the information they need to use their voice terminals. The kit includes:

- A "how-to-use" booklet with procedural instructions plus sample applications
- PC Phone Facts, an enhanced version of the Feature Facts programs available for other phone systems. This is a PC-based program compatible with MS-DOS® personal computers. It contains descriptions of all end-user features, operations of all features by type of terminal, and a file for customizing feature access males
- Selected sample copies of traditional voice terminal user guides
- A list of all available user guides, plus ordering information, for Generic 1 and Generic 3
- A camera-ready Quick Reference Card the customer can have reproduced which briefly outlines operation of the Hold, Conference, Transfer and Drop features
- Line drawings of currently available terminals the customer can reproduce
- A registration card the customer can send to the Customer Information Center to receive future program updates.

**DEFINITY® Communications System Generic 1 and Generic 3—Automatic Call Distribution-Agent Instructions** 555-230-722

Provides information for use by agents after training is completed. The various ACD features are described and the procedures for using them are provided in this document.

**DEFINITY® Communications System Generic 1 and Generic 3—Automatic Call Distribution- Supervisor Instructions** 555-230-724

Provides information for use by supervisors after training is completed. The various ACD features are described and the procedures for using them are provided in this document.

**DEFINITY® Communications System Generic 1 and Generic 3— User's Guide—Hospitality Operations** 555-230-723

Contains procedures for using the Hospitality Services of DEFINITY Generic 1 and Generic 3. These services include a group of system-based features that support the lodging and health industries.

**DEFINITY® Communications System Generic 1 and Generic 3—Installation and Test** 555-230-1o4

Provides the information necessary to perform the tasks of installing and testing the system's common equipment. Includes a description of the necessary tools and equipment.

**DEFINITY® Communications System Generic 3r— Maintenance** 555-230-105

Provides the information necessary for monitoring, testing, and maintaining DEFINITY Generic 3r. It is intended to cover many of the faults and troubles that can occur in the system.

**DEFINITY® Communications System Generic 3r— Upgrades and Additions** 555-230-106

Provides procedures and information required to upgrade from earlier DEFINITY Communications systems to a DEFINITY Generic 3r system and to make additions to an existing system after the initial switch installation.

**DEFINITY® Communications System Generic 1 and Generic 3—System Description** 555-230-200

Provides a technical description of the system and its hardware, environmental and space requirements, and parameters.

**DEFINITY® Communications System Generic 1— Implementation** 555-204-655

Provides the procedures and associated forms for collecting system and terminal software information for G1.1 systems. This information is used to initialize the system using the system administration terminal.

**DEFINITY® Communications System Generic 3r— Implementation** 555-230-651

Provides the procedures and associated forms for collecting system and terminal software information for G3r systems. Also describes various administration commands and error messages. This information is used to initialize the system using the administration terminal.

**DEFINITY® Communications System Generic 1 and Generic 3— Basic Call Management Operations** 555-230-703

Describes all the features and provides the "how-to-operate" instructions for the Basic Call Management System (BCMS) feature.

**DEFINITY® Communications System Generic 1 and Generic 3— System Management** 555-203-500

Describes administration terminal types, function keys, and other administration operations. Also describes various administrative tasks such as logon/logoff, changing of password, remote administration, etc.

**DEFINITY® Communications System Generic 3r—System Reports** 555-230-510

Explains switch-based measurement, traffic, performance, and summary reports. Descriptions include the overall purpose and uses for each report, complete definitions for each field, correlations with other reports, and possible actions that can be taken to further diagnose situations and remedy unsatisfactory conditions.

**DEFINITY® Communications System Generic 3 Call Vectoring Guide** . 585-230-520

Discusses how to write, use, and troubleshoot vectors, which are command sequences that process telephone calls in an Automatic Call Distribution (ACD) environment. The guide is organized into two parts: a step-by-step tutorial that illustrates how to write and implement a basic vector; and a reference with detailed descriptions of the Call Vectoring features, vector management, vector administration, adjunct muting, troubleshooting, and interactions with management information systems (including the Call Management System).

DEFINITY® Communications System CallVisor™ ASAI Technical Reference 555-230-220

This manual is intended for applications designers for use in building and programming custom applications and features using the Adjunct Switch Application Interface.

DEFINITY® Communications System CallVisor™ ASAI Protocol Reference 555-230-221

This manual describes the layer 3 protocol by providing an understanding of the ISDN messages, Facility Information Elements, and Information Elements It is designed for the library or driver programmer of an adjunct computer to use in creating the library of commands used by the applications programmer.

DEFINITY® Communications System Generic 3 Management Applications- Station Provisioning 535-229-201

This manual includes procedures for setting up the PC, loading Generic 3 Management Applications software, and step-by-step bulk administration procedures. It provides details on creating models and station detail record; auditing the data residing on the PC; and generating merged data from the PC to a System 75R1V3, Generic 1, or Generic 3 System.

DEFINITY® communications System Generic 3 Management Applications— Operations 585-229-202

This manual includes initial PC setup procedures as well as detailed steps for the management of switch data for ongoing administration. Data management procedures include gathering switch data for custom reports or for exporting to other systems, making global changes and preprocessing switch transactions.

DEFINITY® Communications System and System 75 and System 85 Traffic Tables 555-104-503

A compilation of the traffic tables and procedures used by traffic engineers and administrators to size trunk groups, ACD groups, and systems.

DEFINITY® Communications System and System 75 and System 85 Traffic Theory 555-104-504

A description of traffic theory fundamentals for switching systems. Provides detailed technical traffic engineering methods for estimating the number of traffic sensitive facilities required in a system.

# Blank Worksheets

# A

Worksheets serve as the suggested means for collecting data for historical comparison purposes. Refer to the heading “Data Analysis” for the corresponding measurements report in Chapter 4 or 5 to obtain information on how to use these forms. Make as many copies of these forms as you need for your data collection and analysis.

WORKSHEET 1

## ATTENDANT GROUP DATA WORKSHEET

**System ID:**

**Location:**
**Group Size:**

| Day of Week | Report Type * | Meas Hour | Calls Ans | Calls Aband | Calls Queued | Calls H-Abd | Calls Held | Time Avail | Time Talk | Time Held | Time Abd | Speed of Answer | Week No. and Date |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M | | | | | | | | | | | | | |
| T | | | | | | | | | | | | | |
| W | | | | | | | | | | | | | |
| T | | | | | | | | | | | | | |
| F | | | | | | | | | | | | | |
| S | | | | | | | | | | | | | |
| S | | | | | | | | | | | | | |
| M | | | | | | | | | | | | | |
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| F | | | | | | | | | | | | | |
| S | | | | | | | | | | | | | |
| S | | | | | | | | | | | | | |

* Report Type: LH for last hour, YP for today's peak, or YP for yesteday's peak

WORKSHEET 2

**ARS PATTERN DATA WORKSHEET**

**System ID:** **Location:** **Report Type = Yesterday ***
**Route-Pattern No:** **Queue Size:**

| Day of Week | Total Calls Offered | Calls Carried | Calls Blocked | Calls Queued | Queue Overflow | % of Calls Carried | | | | | | Week I and Da |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Pref 1 | Pref 2 | Pref 3 | Pref 4 | Pref 5 | Pref 6 | |
| M | | | | | | | | | | | | |
| T | | | | | | | | | | | | |
| W | | | | | | | | | | | | |
| T | | | | | | | | | | | | |
| F | | | | | | | | | | | | |
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| T | | | | | | | | | | | | |
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* Use "Yesterday's report" for the full day mute-pattern measurement.

WORKSHEET 3

## HUNT GROUP DATA WORKSHEET

**System ID:**
**Group ID:**

**Location:**
**Group Size:**
**Queue Size:**

**Group Name:**
**Group Type:**

| Day of Week | Report Type* | Meas Hour | Total Usage | Calls Answered | Calls Abandoned | Calls Queued | Speed of Answer | Week No. and Date |
|---|---|---|---|---|---|---|---|---|
| M | | | | | | | | |
| T | | | | | | | | |
| W | | | | | | | | |
| T | | | | | | | | |
| F | | | | | | | | |
| S | | | | | | | | |
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| M | | | | | | | | |
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| T | | | | | | | | |
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| S | | | | | | | | |
| S | | | | | | | | |
| M | | | | | | | | |
| T | | | | | | | | |
| W | | | | | | | | |
| T | | | | | | | | |
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* Report Type: LH for last hour, TP for today's peak, or YP for yesteday's peak

## WORKSHEET 4

### TRUNK GROUP DATA WORKSHEET

**System ID:** **Location:** **Group Type:**
**Group No:** **Group Size:** **Group Dir:**
**Queue Size:**

| Day of Week | Report Type * | Meas Hour | Total Usage | Total Seize | Inc. Seize | Grp Ovfl | Calls Qued | Que Ovfl | Que Abd | Out Serv | % ATB | % Out Blk | Week No. and Date |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M | | | | | | | | | | | | | |
| T | | | | | | | | | | | | | |
| W | | | | | | | | | | | | | |
| T | | | | | | | | | | | | | |
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| F | | | | | | | | | | | | | |
| S | | | | | | | | | | | | | |
| S | | | | | | | | | | | | | |

* Report Type: LH for fast hour, TP for today's peak, or YP for yesterday's peak

## WORKSHEET 5

### PROCESSOR OCCUPANCY SUMMARY DATA WORKSHEET

**System ID:** **Location:**

| Day of Week | Peak Hour | Stat Occ | CP Occ | SM Occ | Idle Occ | Total Calls | Total ATMPT | INTCOM ATMPT | INC ATMPT | OUT ATMPT | PNET ATMPT | Week No. and Date |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M | | | | | | | | | | | | |
| T | | | | | | | | | | | | |
| W | | | | | | | | | | | | |
| T | | | | | | | | | | | | |
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| F | | | | | | | | | | | | |
| S | | | | | | | | | | | | |
| S | | | | | | | | | | | | |
| 4 Week Avg | NA | | | | | | | | | | | |

"NA" means that the field () should not be calulated.
It is not applicable.

## WORKSHEET 6 1 of 10

**The Call Center Operations worksheet allows AT&T personnel to assess the status and capacity of your DEFINITY Generic 3r switch. The information collected helps AT&T determine the impact of the proposed configuration on your switch.**

**The worksheet contains four general sections: General Business, Incoming Call Management (for example, ACD), Outgoing Call Management, and Call Flows. The general business section provides the general business (non ICM/OCM) call traffic mix expected for the switch. The Incoming Call Management (ICM) section provides general information about inbound telemarketing operations. The Outgoing Call Management (OCM) section provides general information about outbound telemarketing operations. The Call Flows section provides a list of important items to include in the customer call flows and several examples of appropriate call flows.**

**The accuracy of the information provided determines whether realistic and achievable switch capacity estimates can be obtained. Therefore, it is STRONGLY recommended that the information provided is as accurate as possible and be reviewed by the customer and the appropriate AT&T representative.**

### General Business

1. **Indicate how much of the general business traffic (non-ICM/OCM) in your system fits into each of the following categories. Use percentages. The five categories must add to 100%**

| Traffic Type | Percentage |
|---|---|
| Intercom | ________ |
| Incoming | ________ |
| Outgoing | ________ |
| Private Network (ETN, UDP, DCS) | ________ |
| Vectoring General Business (Note) | ________ |
| Total | 100% |

**NOTE:**
**Vectoring General Business applies to incoming calls that use Call Vectoring and terminate to destinations other than ACD splits.**

A

WORKSHEET 6 2 of 10

2. Indicate the call characteristics for each of the categories above. Again, each category (intercom, incoming, outgoing, private networking) must add to 100%.

| | | |
|---|---|---|
| Intercom | Answered | ______ |
| | Coverage (Note 1) | ______ |
| | Auto Call Back | ______ |
| | Total | 100% |
| Incoming | DID Answered | ______ |
| | DID Coverage (Note 1) | ______ |
| | Attendant Answered (Note 2) | ______ |
| | Attendant Extended (Note 3) | ______ |
| | Total | 100% |
| Outgoing | DOD 7/8 Digit Calls | ______ |
| | DOD 10/1 1 Digit Calls | ______ |
| | Total | 100% |
| Private Networking | homing Answered | ______ |
| | Incoming Coverage (Note 1) | ______ |
| | Outgoing | ______ |
| | Tandem | ______ |
| | Total | 100% |

1. Coverage means that the call goes to coverage without being answered at the original destination.
2. Attendant answered means that an attendant answers a call, handles the caller's request and disconnects.
3. Attendant extended means that an attendant answers a call and extends the call to a station that answers.

3. For the general business traffic (non ICM/OCM), specify the percentage (%) of calls that fit into the following categories. Percentages do not need to add up to 100%.

| | |
|---|---|
| DCS Calls on Private Network | ______ |
| ISDN-PRI on Private Network | ______ |
| ISDN-PRI on Incoming Calls | ______ |
| ISDN-PRI on Outgoing Calls | ______ |
| ISDN-PRI on General Business Vectoring | ______ |

4. Specify the number of SMDR ports used (maximum 2) ______
5. Specify the percentage of calls on Intra-Switch SMDR ______

**NOTE:**
Note that a maximum of 200 stations can simultaneously use the Intra-Switch SMDR feature.

## WORKSHEET 6 3 of 10

6. Specify the percentage of total business traffic that terminates and originates at each of the following types of stations. Percentages must add up to 100%.

| | |
|---|---|
| Analog Stations | ____________ |
| DCP Non-display | ____________ |
| DCP with Display | ____________ |
| ISDN BRI | ____________ |
| Total | 100% |

7. For the general business traffic indicate how coverage calls are handled. The total of the percentages below cannot exceed 100%.

   - Specify the percentage of all coverage calls that go to AUDIX Voice Messaging System. ____________
   - Specify the percentage of all coverage calls that go to an ASAI Messaging Service that sets the Message Waiting Indicator (Set Value - Message Waiting Indicator) ____________

8. Specify the percentage of general business calls that involve an ASAI monitored/controlled station (3rd Party Domain Control) ____________

9. Specify the percentage of the domain controlled calls (from 8 above) that are initiated via ASAI (3rd Party Auto Dial)

10. Provide the appropriate call flow for call vectoring, if any, as specified in the Call Flow Section.

### Incoming Call Management (ICM)

1. Specify the percentage of your system's inbound ICM traffic that fits into the following categories:

| | |
|---|---|
| ICM Calls using ISDN PRI facilities | ____________ |
| ICM Calls using SMDR | ____________ |

2. Indicate in minutes per hour the expected agent efficiency (that is, in a typical hour how many minutes is an agent active on ACD Calls or available to receive ACD Calls?) ____________

**NOTE:**
Agents in After Call (ACW) and Auxiliary (AUX) work modes are not available to receive calls.

WORKSHEET 6 4 of 10

3. **Specify the maximum number of inbound ACD agents (exclude Voice Response Unit ports) on the system** ____________

4. **Specify the percentages of ICM traffic that terminates at each of the following station types (this is not the administered number of ACD stations, but the actual station mix used to answer calls). Percentages must add up to 100%.**

| | |
|---|---|
| Analog Stations | ____________ |
| DCP Non-display | ____________ |
| DCP with Display | ____________ |
| ISDN BRI | ____________ |
| Total | 100% |

5. **Provide the appropriate call flows as specified in the Call Flow Section.**

## Outgoing Call Management (OCM)

1. **Specify the percentage of your system's outbound OCM traffic that fits into the following categories:**

| | |
|---|---|
| OCM Calls using ISDN trunks | ____________ |
| OCM Calls using SMDR | ____________ |

2. **Specify the average number of rings for calls that are never answered** ____________

3. **Specify the average number of rings for calls that are answered** ____________

4. **Indicate in minutes per hour the expected agent efficiency (that is, in a typical hour how many minutes is an agent active on outbound calls or available to initiate outbound OCM calls?)** ____________

**NOTE:**
**Agents in After Call (ACW) and Auxiliary (AUX) work modes are not available to receive calls.**

5. **Specify the maximum number of outbound ACD agents (exclude Voice Response Unit ports) on the system** ____________

WORKSHEET 6 5 of 10

6. **Specify the station type mix (in percentages) used by active ACD agents (this is not the administered number but the actual mix used by agents in the outbound calling). Percentages must add up to 100%.**

| | |
|---|---|
| Analog Stations | ____________ |
| DCP Non-display | ____________ |
| DCP with Display | ____________ |
| ISDN BRI | ____________ |
| Total | 100% |

7. **Is CMS/BCMS used to monitor and measure the outbound ACD calls?** ____________

8. **Provide the appropriate call flows as specified in the Call Flow Section.**

## Call Flows

**Using Figures A-1, A-2, A-3, and A-4 as examples, specify a call flow, complete with percentages, that best depicts the call operations during the busy hour. As a minimum, call flows should be provided for general business call vectoring, Incoming Call Management, and Outgoing Call Management areas. If there are several different call flows within each area, draw a call flow for each and give the percentages of the overall traffic that each call flow represents. Table A-1 shows the most important items to include in the call flow for each of the call categories: General Business (Call Vectoring), ICM, and OCM.**



Table A-1. Items to Include in Call Flow Diagrams

| Items | General Business Call Vectoring | ICM | OCM |
|---|---|---|---|
| Call Vectoring Commands Executed | X | X | |
| — Announcement | X | X | |
| — Wait | X | X | |
| — Collect Digit | X | X | |
| — Total Digits Collected | X | X | |
| — Available Agent Conditional Checks | | X | |
| — Conditional Checks (Goto, Route to, and Check Backup) other than Available Agents | X | X | |
| — Unconditional Route to | X | X | |
| — Successful Queue Commands | | X | |
| — Messaging (AUDIX Messaging System only) | X | X | |
| — ASAI Adjunct Routing | | X | |
| — Look Ahead Interflow Successes | | X | |
| — Look Ahead Interflow Failures | | X | |

WORKSHEET 6 6 Of 10

Table A-1. Items to Include in Call Flow Diagrams (Continued)

| Items | General Business Call Vectoring | ICM | OCM |
|---|---|---|---|
| ACD Split Actions | | X | X |
| — Announcements (Forced First/Recurring) | | X | X |
| — Queued | | X | X |
| — Intraflow | | X | |
| — Voice Response Unit (VRU) Transfers | | X | |
| — AUDIX as Automated Attendant | | X | |
| CallVisor Related Actions | | X | X |
| — ISDN Gateway (IG) Event Reporting | | X | |
| — ASAI Event Reporting (Event Notification) | | X | |
| — ASAI Transfers/Conferences (3rd Party Merge) | | X | X |
| — ASAI Change Work Modes (Request Feature) | | X | X |
| — ASAI Queries (Value Queries) for Agents, Splits | | X | X |
| and Trunk Status | | | X |
| — ASAI Call Termination (3rd Party Drop/Clear Call) | | | X |
| — User/Switch Classified 3rd Party Make Calls | | | |
| Other | X | X | X |
| — Call Holding Time Per Agent | | X | X |
| — VRU Usage | | X | X |
| — Call Transfers/Conferences | | X | X |
| — Digits Dialed (7 or 10 Digits) | | | X |
| — Call Classification Outcomes | | | X |
| — Coverage Usage | X | | |
| — Attendant Extended Calls | X | | |

**Information sources for developing an accurate call flow can be obtained from:**

1. **BCMS Historical Reports - Daily and Hourly Split and System Reports.**
2. **CMS Historical Reports - Split and System Reports.**
3. **Hunt Group Measurements Report.**

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## Calls to VRU Transferred to Agent Split

**This call flow includes:**

- **CMS Reporting**
- **CallVisor ASAI Event Reporting on All Splits (VRU and Agent Splits)**
- **Non-ISDN Trunks**
- **CONVERSANT® VIS, VRU**

  **VRU Transfers via Switch-Hook Flashes.**

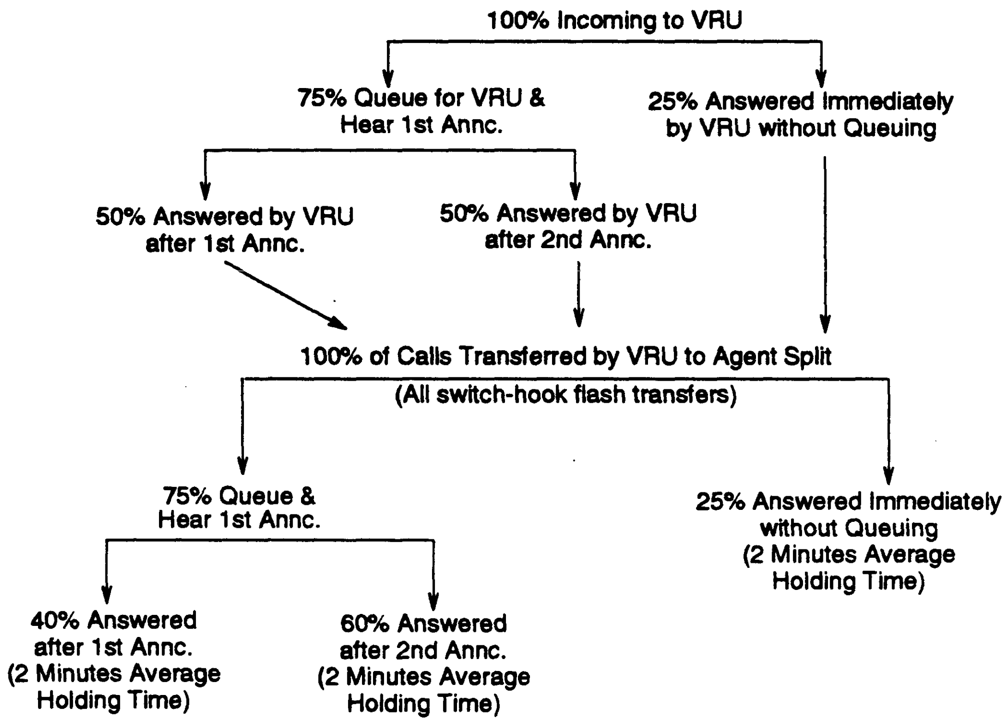


Figure A-1. Sample ACD - ICM Call Flow

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## Calls to Vector Application - Call Vector Not Defined

**The following call flow presents a call vectoring application before the call vector has been defined. The following items are used with the call flow.**

**All calls provide ASAI Event Reporting**

- **50% of the calls use ISDN trunks**
- **All transfers are done manually by the agents at their voice terminals**
- **A performance objective of no more that 0.2% of the calls would listen to a second announcement while in queue and no calls should receive busy signal.**

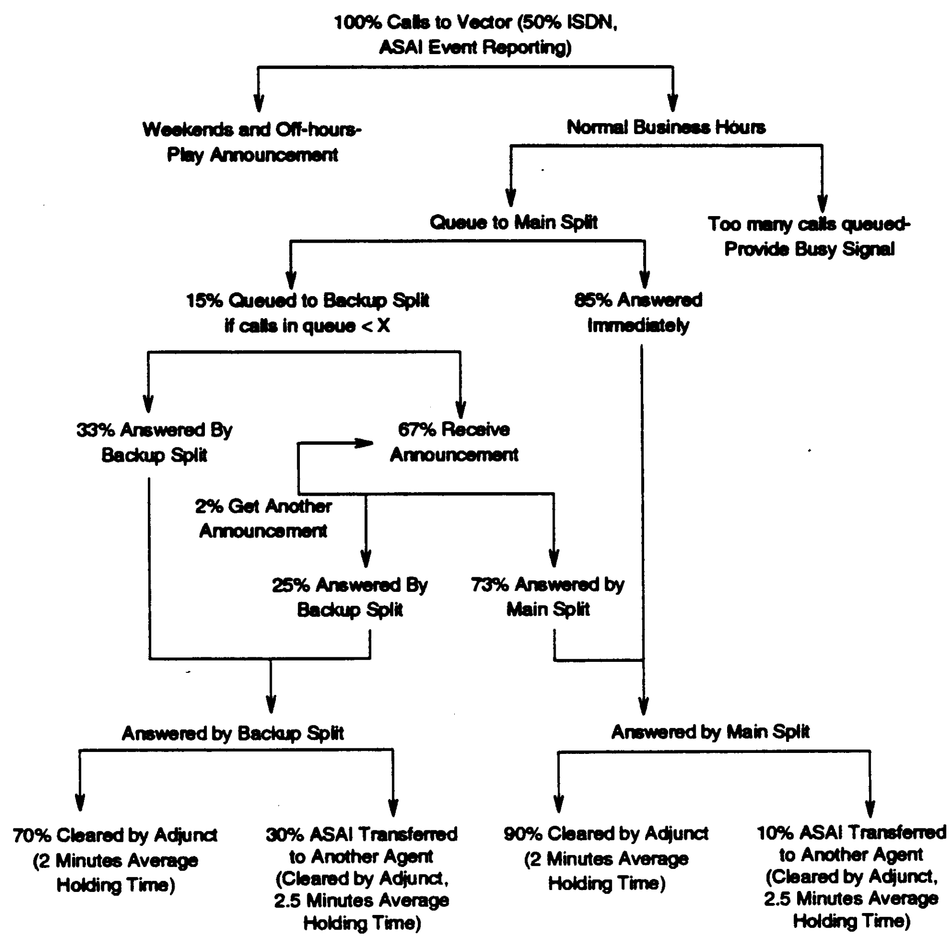


Figure A-2. Sample Call Vectoring Call Flow

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**Calls to Vector Application - Call Vector Defined**

**The following call flow presents a call vectoring application after the call vector has been defined. The sample call vector below is used:**

1. **Goto Step 3 if time-of-day is sat 00:00 to sun 23:59**
2. **Goto Step 5 if time-of-day is all 6:30 to all 16:45**
3. **Wait 2 sees hearing ringback**
4. **Disconnect after announcement extension 7000**
5. **Goto Step 13 if calls-queued in split 7 is >9 priority top**
6. **Queue to main split 7 priority top**
7. **Check backup split 9 priority top if available-agents >0**
8. **Wait time 4 sees hearing ringback**
9. **Announcement 7010**
10. **Wait time 30 sees hearing music**
11. **Announcement 7020**
12. **Goto Step 10 if unconditionally**
13. **Busy**

**Note that since the busy hour is being analyzed, all calls get to Step 5. In addition we know that 90% of the calls are answered in 10 seconds or less and that the remaining 10% of the calls are answered within 30 seconds or less.**

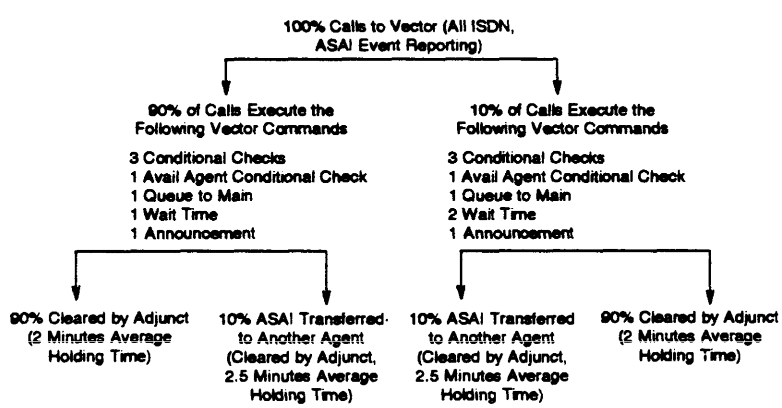


Figure A-3. Sample ICM Call Vectoring Call Flow

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## ASAI Switch Classified Calls

**The ASAI adjunct originates all calls via the 3rd Party Make Call capability and uses the switch's call classifier board.**

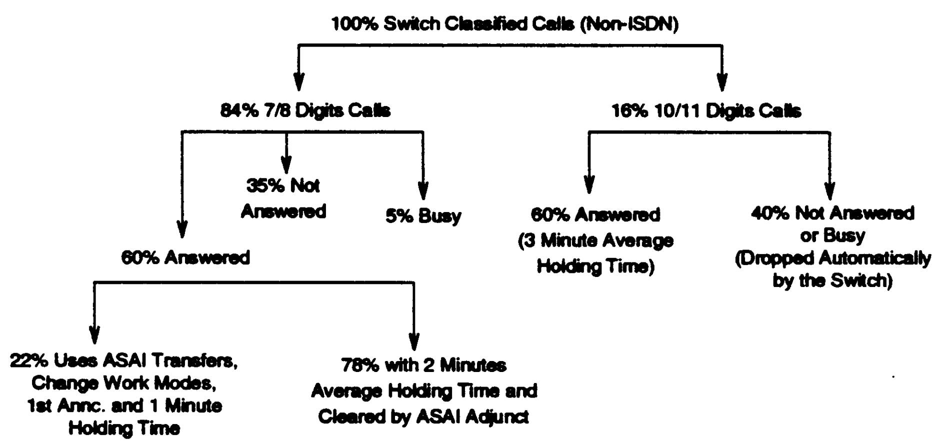


Figure A-4. Sample OCM Call Flow

# Printer Option

# B

## AT&T 475 Printer

The AT&T 475 printer, when used for the System Printer application, requires the following option switch settings.

| Switch 1 | Switch 2 | Switch 21 |
|---|---|---|
| 1 - closed | 1 - open | 1 - open |
| 2 - closed | 2 - open | 2 - open |
| 3 - open | 3 - open | 3 - open |
| 4 - closed | 4 - open | 4 - open |
| 5 - closed | 5 - open | 5 - closed |
| 6 - open | 6 - open | 6 - closed |
| 7 - open | 7 - closed | 7 - open |
| 8 - closed | 8 - open | 8 - closed |

| Switch 22 | Switch 23 | Switch 24 |
|---|---|---|
| 1 - open | 1 - closed | 1 - closed |
| 2 - closed | 2 - open | 2 - closed |
| 3 - closed | 3 - open | 3 - open |
| 4 - open | 4 - open | 4 - closed |
| | 5 - closed | 5 - closed |
| | 6 - open | 6 - open |
| | | 7 - open |
| | | 8 - closed |

# AT&T 572 Printer

The AT&T 572 printer, when used for the System Printer application, requires the following programmable options.

| | Function Number | Menu Number | Status |
|---|---|---|---|
| 01 | FORM LENGTH | 09 | 11 |
| 02 | LPI | 01 | 6 |
| 03 | CPI | 01 | 10 |
| 04 | LQ OR NLQ | 01 | LQ |
| 05 | BUZZER | 01 | ON |
| 06 | FONT | 02 | FONTCART |
| 07 | RESOLUTION | 01 | 144 |
| 11 | BUFFER | 02 | ON-LINE |
| 13 | PW ON MODE | 01 | ON-LINE |
| 14 | DIRECTION | 01 | BI-DIR.1 |
| 15 | BUF. FULL | 02 | LF + CR |
| 16 | P.E. | 01 | ACTIVE |
| 17 | AUTO OR | 01 | CR + LF |
| 18 | ZERO | 01 | 0 |
| 22 | AUTO LF | 01 | CR ONLY |
| 31 | 1" SKIP | 01 | OFF |
| 32 | CHAR. SET | 02 | USA |
| 33 | CHAR. SET | 01 | UK |
| 34 | CHAR. SET | 03 | GE |
| 35 | CHAR. SET | 07 | LINE DRAWING |
| 81 | OFF-LINE | 07 | ALL RECEIVE |
| 82 | DSR | 02 | OFF |
| 83 | RTS TIMING | 01 | RTS |
| 84 | CD | 02 | OFF |
| 85 | CTS | 02 | OFF |
| 91 | OVER RUN | 02 | 256 |
| 92 | DATA BIT | 02 | 8 |
| 93 | PROTOCOL | 03 | XON/XOFF |
| 94 | STOP BIT | 01 | 1 |
| 95 | PARITY | 01 | NON |
| 96 | BPS | 01 | 9600* |

* This should be set to the same speed as the data module.

# List of Abbreviations

## A

**AAR**
Automatic Alternate Routing

**AC**
Attempting Current

**ACA**
Automatic Circuit Assurance

**ACB**
Automatic Callback

**ACD**
Automatic Call Distribution

**ACU**
Automatic Call Unit

**ACW**
After Call Work

**AD**
Abbreviated Dialing

**ADU**
Asynchronous Data Unit

**AE**
Access Endpoint

**AIM**
Asynchronous Interface Module

**ALM-ACK**
Alarm Acknowledge

**AMW**
Automatic Message Waiting

**A N**
Analog

**ANI**
Automatic Number Identification

**AOL**
Attendant Offered Load

**AP**
Applications Processor

**APLT**
Advanced Private Line Termination

**ARS**
Automatic Route Selection

**ASAI**
Adjunct Switch Applications Interface

ASCII
American Standard Code for Information Interchange

**ATB**
All Trunks Busy

**ATD**
Attention Dial

**AUDIX**
Audio Information Exchange

**AVD**
Alternate Voice Data

**AWT**
Average Work Time

## B

**BCC**
Bearer Capability Class

**BCMS**
Basic Call Management System

**BCT**
Business Communications Terminal

**BHCC**
Busy Hour Call Completions

**BLF**
Busy Lamp Field

**BOS**
Bit Oriented Signaling

**BRI**
Basic Rate Interface

**BTU**
British Thermal Unit

# C

**CACR**
Cancellation of Authorization Code Request

**CAG**
Coverage Answer Group

**CAMA**
Centralized Automatic Message Accounting

**CARR-POW**
Carrier Port and Power Unit for AC Powered Systems

**CAS**
Centralized Attendant Service

**CA-TSC**
Call Associated Temporary Signaling Connection

**CBC**
Call-by-Call

**cc**
Country Code

**CCIS**
Common Channel Interoffice Signaling

**CCITT**
Consultative Committee for International Telephone and Telegraph

**CCMS**
Common Channel Message Set

**CCS**
Hundred Call Seconds

**CCSA**
Common Control Switching Arrangement

**CDM**
Channel Division Multiplexing

**CDOS**
Customer-Dialed and Operator Serviced

**CDRR**
Call Detail Recording and Reporting

**CDRU**
Call Detail Recording Utility

**CEM**
Channel Expansion Multiplex

**CI**
Clock Input

**CMDR**
Centralized Message Detail Recorder

**CMS**
Call Management System

**CO**
Central Office

**COR**
Class of Restriction

**COS**
class of service

**CP**
Circuit Pack

**CPE**
Customer Provided Equipment

**CPN/BN**
Calling Party Number/Billing Number

**CPTR**
Call Progress Tone Receiver

**CRC**
Cyclical Redundancy Checking

**CSA**
Canadian Safety Association

**CSD**
Customer Service Document

**CSM**
Centralized System Management

**CSU**
Channel Service Unit

**CTS**
Clear to Send

**CWC**
Call Work Codes

# D

**DAC**
Direct Agent Calling

**DC**
Direct Current

**DCE**
Data Communications Equipment

**DCP**
Digital Communications Protocol

**DCS**
Distributed Communications System

**DDC**
Direct Department Calling

**DDD**
Direct Distance Dialed

**DID**
Direct Inward Dialed

**DIOD**
Direct Inward and Outward Dialing

**DLC**
Data Line Circuit

**DLDM**
Data Line Data Module

**DMI**
Digital Multiplexed Interface

**DND**
Do Not Disturb

**DNIS**
Dialed Number Identification Service

**DOD**
Direct Outward Dialed

**DOSS**
Delivery Operations Support System

**DOT**
Duplication Option Terminal

**DPR**
Dual Port RAM

**DS1**
Digital Service Interface

**DSU**
Data Service Unit

**DS1**
Data Services Level 1

**DTDM**
Digital Terminal Data Module

**DTE**
Data Terminal Equipment

**DTGS**
Direct Trunk Group Select

**DTMF**
Dual Tone Multifrequency

**DTMR**
Dual Tone Mulit-Frequency Receiver

**DXS**
Direct Extension Selection

# E

**EBCDIC**
Extended Binary Coded Decimal Interexchange Code

**ECC**
Error Correct Code

**EFP**
Electronic Power Feed

**EI**
Expansion interface

**EIA**
Electronic Industries Association

**EMI**
Electro-Magnetic Interference

**EPN**
Expansion Port Network

**EPROM**
Erasable Programmable Read Only Memory

**EPSCS**
Enhanced Private Switched Communications Services

**ESF**
Extended Superframe Format

**ETN**
Electronic Tandem Network

**E&M**
Ear and Mouth (Receive and Transmit)

# F

**FAC**
Feature Access Code

**FAS**
Facility Associated Signaling

**FAT**
Facility Access Trunk

**FCC**
Federal Communications Commission

**FEAC**
Forced Entry of Account Codes

**FIC**
Facility Interface Codes

**FNPA**
Foreign Numbering Plan Area

**FRL**
Facility Restriction Level

**FX**
Foreign Exchange

# G

**GPTR**
General Purpose Tone Receiver

**GRS**
Generalized Route Selection

# H

**HNPA**
Home Numbering Plan Area Code

# I

**IAS**
inter-PBX Attendant Service

**IC**
Inter-Cabinet

**ICC**
Inter Carrier Cable

**ICDOS**
International Customer Dialed Operator Serviced

**ICHT**
Incoming Call Handling Table

**ICI**
Incoming Call Identifier

**ICM**
Inbound Call Management

**IDDD**
International Direct Distance Dialing

**IE**
Information Element

**INADS**
Initialization and Administration System

**INS**
ISDN Network Service

**INWATS**
Inward Wide Area Telephone Service

**ISDN**
Integrated Services Digital Network

**ISN**
Information Systems Network

**ITP**
Installation Test Procedures

**IXC**
Inter-Exchange Carrier

## K

**KBPS**
Kilo-Bits Per Second

## L

**LAN**
Local Area Network

**LAPD**
Link Access Procedure Data

**LATA**
Local Access and Transport Area

LDN
Listed Directory Number

**LDS**
Long-Distance Service

**LEC**
Local Exchange Carrier

**LED**
Light-Emitting Diode

**LSU**
Local Storage Units

**LWC**
Leave Word Calling

## M

**MAP**
Maintenance Action Process

**MA-UUI**
Message Associated User-to-User Signaling

**MBPS**
Mega-Bits Per Second

**MCC**
Multi-Carrier Cabinet

**MCS**
Message Center Service

**MDM**
Modular Data Module

**MDR**
Message Detail Record

**MET**
Multibutton Electronic Telephone

**MIM**
Management Information Message

**MIS**
Management Information System

**MISCID**
Miscellaneous Identification

**MMS**
Material Management Services

**MOS**
Message Oriented Signaling

**MPDM**
Modular Processor Data Module

**M S**
Message Server

**MSA**
Message Servicing Adjunct

**MTDM**
Modular Trunk Data Module

**MTP**
Maintenance Tape Processor

**MTT**
Mutti-Tasking Terminal

**MWL**
Message Waiting Lamp

**M-BUS**
Memory Bus

AB

## N

**NANP**
North American Numbering Plan

**NAU**
Network Access Unit

**NCATSC**
Non-Call Associate/Temporary Signaling Connection

**NCOSS**
Network Control Operations Support Center

**NCSO**
National Customer Support Organization

**NEC**
National Engineering Center

**NFAS**
Non-Facility Associated Signaling

**NID**
Network Inward Dialing

**NN**
National Number

**NPA**
Numbering Plan Area

**NPE**
Network Processing Element

**NQC**
Number of Queued Calls

**NSE**
Night Service Extension

**NSU**
Network Sharing Unit

**NXX**
Public Network Office Code

## O

**OA**
Operator Assisted

**OCM**
Outbound Call Management

**OPS**
Off-Premises Station

**OQT**
Oldest Queued Time

**OSHA**
Occupational Safety and Health Act

**OSS**
Operations Support System

**OTQ**
Outgoing Trunk Queuing

## P

**PBX**
Private Branch Exchange

**PC**
Personal Computer

**PCM**
Pulse Code Modulated

**PCOL**
Personal Central Office Line

**PCOLG**
Personal Central Office Line Group

**PCS**
Permanent Switched Calls

**PDM**
Processor Data Module

**PDS**
Premises Distribution System

**PE**
Processing Element

**PEC**
Price Element Codes

**PEI**
Processor Element Interchange

**PGN**
Partitioned Group Number

**PI**
Processor Interface

**PIB**
Processor Interface Board

**PL**
Private Line

**PMS**
Property Management System

**PN**
Port Network

**PPN**
Processor Port Network

**PRI**
Primary Rate Interface

**PSC**
Premises Service Consultant

**PSDN**
Packet Switch Public Data Network

**PT**
Personal Terminal

**PTC**
Positive Temperature Coefficient

# R

**RAM**
Random Access Memory

**RBS**
Robbed-Bit Signaling

**RCL**
Restricted Call List

**RFP**
Request For Proposal

**RHNPA**
Remote Home Numbering Plan Area

**RLT**
Release Link Trunk

**RNX**
Private Network Office Code

**ROM**
Random Access Memory

**RPN**
Routing Plan Number

**RSC**
Regional Support Center

# S

**SABM**
Set Asynchronous Balance Mode

**SAKI**
Sanity and Control interface

**SAT**
System Access Terminal

**SCC**
Single Carrier Cabinet

**SCI**
Switch Communications Interface

**SCO**
System Control Office

**SDDN**
Software Defined Data Network

**SDN**
Software Defined Network

**SID**
Station Identification Number

**SIT**
Special Information Tones

**SMDR**
Station Message Detail Recording

**SPE**
Switch Processing Element

**SPID**
Service Profile Identifier

**SSI**
Standard Serial Interface

**STARLAN**
Star-based Local Area Network

**ST3**
Stratum 3 Clock Board

**SVN**
Security Violation Notifition

**SXS**
Step-by-Step

# T

**TAAS**
Trunk Answer From Any Station

**TAC**
Trunk Access Code

**TC**
Technical Consultant

**TCM**
Traveling Class Mark

**TDM**
Time Division Multiplex

**TDR**
Time of Day Routing

**TEG**
Terminating Extension Group

**TEI**
Terminal Endpoint Identifier

**TOD**
Time of Day

**TOP**
Transaction Oriented Protocol

**TSC**
Technical Service Center

**TTR**
Touch Tone Receiver

**TTT**
Terminating Trunk Transmission

**TTTN**
Tandem Tie Trunk Network

**TTY**
Teletypewriter

# U

**UAP**
Usage Allocation Plan

**UART**
Universal Asynchronous Transmitter

**UCD**
Uniform Call Distribution

**UCL**
Unrestricted Call List

**UDP**
Uniform Dial Plan

**UL**
Underwriter Laboratories

**UNP**
Uniform Numbering Plan

**UPS**
Uninterruptible Power Supply

**USOP**
User Service Order Profile

# V

**VDN**
Vector Directory Number

**VLSI**
Very Large Scale Integration

**VM**
Voltmeter

## W

**WATS**
Wide Area Telecommunications Service

**WSA**
Waiting Session Accept

## Z

**ZCS**
Zero Code Suppression

# Glossary

## A

**Abandoned Call**
An incoming call where the caller hangs up before being answered.

**ACD**
See Automatic Call Distribution.

**ACD Calls**
The number of ACD calls that are processed during the current reporting period for the specified ACD agent. A status parameter that identifies the number of ACD calls that a particular agent processed during the current reporting period.

**ACD Split (or Split)**
A group of extensions that are staffed by agents trained to handle a certain type of incoming call. Valid split numbers range from one through 99. Each number identifies a unique grouping of ACD agent positions. (Also referred to as an ACD hunt group or just hunt group.)

**Agent (or ACD Agent)**
An answering position who receives calls that are directed to a split. A member of an ACD hunt group (ACD split).

**Attendant Group**
All of the administered attendant positions.

**Attendant Offered Load**
The total quantity of traffic that is presented to the attendant group.

**Automatic Call Distribution (ACD)**
A communications control system that automatically distributes incoming calls to one or more groups of agents. Each unique grouping of agents is referred to as a split.

**Auto-In Trunk Groups**
Those trunk groups where the Central Office (CO) processes all of the digits for the incoming call. Whenever the DEFINITY Generic 1 switch determines that the CO has seized a trunk from an Auto-In trunk group, it automatically (without processing any digits) connects the trunk to the destination. The destination will typically be a queue in which the callers wait to be answered in the order in which they were received.

**Auxiliary Work (Aux-Work) Mode**
In this mode, agents are unavailable to receive ACD calls. Agents should enter Aux-Work mode when involved in non-ACD activities such as taking a break, going to lunch, or placing an outgoing call.

When agents log in, they are automatically placed in the Aux-Work mode. They can then use the Auto-In or Manual-In feature to answer the first call. Also, the last available agent in a split cannot enter the Aux-Work mode if any ACD calls are remaining in the queue. If the last available agent attempts to enter Aux-Work mode, the following occurs:

- New calls to the hunt group receive a busy tone or are redirected to coverage,
- Calls already in the queue are routed to the agent until the queue is empty.

- If the last available agent has an Aux-Work button, the light next to the button flashes until all calls in the queue are answered. When the last call is answered, the light next to the button goes on steadily, and the agent can then enter Aux-Work mode.

**Available (Avail)**
Indicates that the agent/server group is available and ready to receive the call.

**Average Answer Speed**
The average time, in seconds, that it takes before a call is answered. This average includes both queue time and time ringing at the servers' terminal.

**Average Holding Time**
The average length of time, in seconds, a facility (such as trunk) is used to serve a call.

# B

**Blocked Call**
The condition encountered whenever a call seeks to use a particular trunk group but is blocked. Typically the reason that the call is blocked will be because all trunks within the group are busy; however, other reasons are also possible (for example, the facilities are maintenance busy).

**Busy Hour Call Capacity (BHCC)**
The maximum number of completed calls the switch processor can support in an hour without degradation of service.

# C

**Call Classifier (CC)**
CCS are devices which monitor outbound calls from inception to a state in which their outcome is known. Call classifiers are intended for call prompting applications. There are two types of call classifiers:

- Touch Tone Receivers (TTR) detect touch tones and are similar to Dual-Tone Multi-Frequency (DTMF) receivers. TTRs can be queued up to four deep, systemwide.
- Call Progress Tone Receivers (CPTR) detect call progress tones such as dialtone and answer tones.

TN744 Call Classifier circuit packs can be set for either call classification or touch-tone reception. They have eight ports.

**Call-by-call (CBC) Service Selection**
A feature that allows a communications system to request, on a call-by-all basis, services and/or features for a particular call on an ISDN-PRI facility. CBC allows various voice and data services to be integrated onto a single transmission facility with flexible assignment of trunks to services. See *also* Usage Allocation Plan.

**Carried Load**
The amount of traffic actually sewed by traffic-sensitive facilities during a given interval.

**CCS or Hundred Call Seconds**
A standard telecommunications industry traffic measurement term meaning hundred call seconds. It is employed to determine usage. In order to determine usage for a facility, it is scanned every 100 seconds. If the facility is found busy, it is assumed to have been busy for the entire scan interval. There are 3600 seconds per hour. The Roman numeral for 100 is the capital letter "C". The abbreviation for call seconds is CS. Therefore, 100 call seconds is abbreviated CCS. If a facility is busy for an entire hour, then it is said to have been busy for 36 CCS. See *also* Erlang.

**Communications System Manager**
The customer representative who maintains overall responsibility for the switch and its day-to-day functions.

# E

**Erlang**
A unit of traffic intensity, or load, used to express the amount of traffic it takes to keep one facility busy for one hour. One Erlang is equal to 36 CCS. *See also* Hundred Call Seconds.

**Erlang-C**
A traffic theory that assumes calls will be delayed (that is, queued) if they arrive when all circuits are busy. *See also* Erlang.

**Erlang-C Finite Queue**
An Erlang-C traffic theory that further assumes a limited length queue list. *See also* Erlang-C.

**Erlang-C Infinite Queue**
An Erlang-C traffic theory that further assumes the queue contains enough slots so that it is "essentially" infinite and can hold all requests for service while they are delayed. *See also* Erlang-C.

**Errored Second**
A second in which at least one bit error occurs.

# G

**Grade of Service**
The number of call attempts that fail to receive service immediately. Grade of service is also expressed as the quantity of all calls that are blocked or delayed.

# H

**Holding Time**
The total length of time in minutes and seconds that a facility is used during a call.

**Hunt Group**
A group of agents which receives a high volume of calls. Hunting is accomplished through the ACD feature. It minimizes call completion time. If all members of a group are active, the call can route to another. *See also* ACD Split.

# M

### Manager I Terminal

The terminal that is used by the system administrator to administer the DEFINITY Generic 1 system. The terminal is also used to execute traffic measurement commands.

### Measurement Hour

The starting time (using 24-hour clock) of the hour during which data was recorded.

# O

### Offered Load

The traffic that would be generated by ail the requests for service occurring within a monitored interval, usually one hour.

# P

### Peak Hour

The hour, either yesterday or today, during which the largest number of reported events occurred. (Also referred to as Busy Hour.)

# Q

### Queue

Places incoming calls in an order (first-in, first-out) when attempting to reach a facility and all members/servers are busy.

# R

### Report Scheduler

Software that is used in conjunction with the system printer for the purpose of scheduling the days of the week and time of day that the desired reports are to be printed.

## S

**Speed of Answer**
*See also* Average Answer Speed.

**Split**
A group of extensions, which are also known as a hunt group, that directly receives calls from one or more trunk groups.

**Station Message Detail Recording (SMDR)**
A switch feature that utilizes software and hardware to record call data.

**System Administrator**
The designated individual who maintains overall customer responsibility for system administration. Generally, all administration functions are performed from the Manager I terminal. The switch requires a special login, referred to as the system administrator login, in order to gain access to the system administration capabilities.

**System Printer**
An optional printer that maybe used to print scheduled reports via the Report Scheduler.

## T

**Talk Time**
The total time that the servers (attendants) were active or talking during the measurement interval.

**Time Division Multiplexer (TDM)**
Time Division Multiplexer (TDM) has 512 64KB time slots.

**Time Interval**
The period of one hour during which traffic measurements are collected for a report(s). Also referred to as measurement interval.

**Trunk**
A communication channel that connects two or more switching systems. A trunk also connects the switch to the public network

**Trunk Group**
A grouping of several communication channels that all have the same functional characteristics (for example, all trunks are one-way incoming, all trunks are one-way outgoing,all trunks permit two-way seizure, etc.).

# U

**Usage**

The time, typically expressed in CCS, during which resources are in use. This is also called the traffic load.

**Usage Allocation Plan (UAP)**

A defined strategy for dynamically allocating the ISDN-PRI trunking facilities to the competing network services/features.

# Index

## 0



## A



## B



## C



IN

# D



# E



# F



# G



# H



# I



# L



# M

## O



## P



## Q



## R

# S



# T



# U