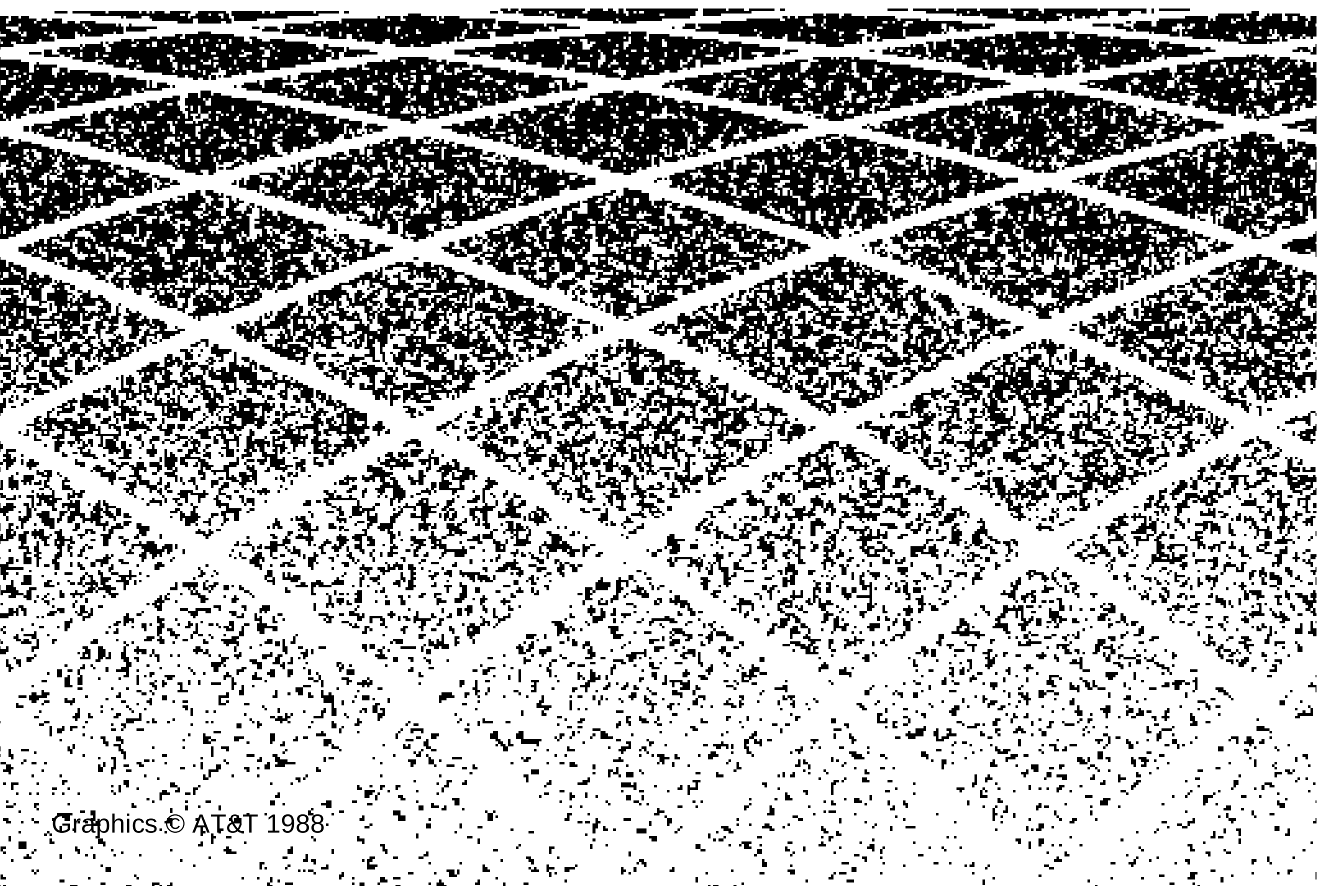
DEFINITY® Communications System Generic 3 Version 4 Traffic Reports



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About This Document

This document provides a comprehensive description of the performance reports that are available with the DEFINITY Communications System Generic 3s, Generic 3i, and Generic 3r.

Purpose of Traffic 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, etc. 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 six 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, and how to interpret each report’s data. It also lists “Suggested Actions” that may be taken if a particular field should report data indicating an abnormal condition.
- Chapter 5, "Security Violations Reports" describes the reports that contain data on possible security violations.
- Chapter 6, "References" provides an abbreviated listing and description of system documents. Ordering information is also included.
- Chapter A, "Blank Worksheets"
  - Attendant Group Data Worksheet—Used for historical purposes to record the Attendant Group daily measurements for the selected days.

- — Routing Pattern Data Worksheet—Used for historical purposes to record the Routing 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 days.
- — Wideband Trunk Group Worksheet—Used for historical purposes to record the Wideband Trunk Group daily measurements for the selected trunk groups and days.
- — 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.

- Chapter B, "Printer Options"
  - — AT&T 475 Printer—Lists 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.
- Abbreviations contains a list of abbreviations.
- Glossary contains a list of frequently used terms and their definitions.
- Index

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 and Generic 3 — System Management*, 555-230-500
- *DEFINITY Communications System Generic 3 — Feature Description*, 555-230-204
- *DEFINITY Communications System Generic 3 — System Description and Specifications*, 555-230-206
- *DEFINITY Communications System Generic 3r — Maintenance*, 555-230-105
- *DEFINITY Communications System and System 75 and System 85— DS1/DMI/ISDN-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 System 85 — Traffic Tables*, 555-104-503
- *DEFINITY Communications System Generic 3 V2 — Implementation*, 555-230-653
- *DEFINITY Communications System Generic 3 — Basic Call Management Operations*, 555-230-704
- *DEFINITY Communications System Generic 3r System Reports*, 555-230-510
- *GBCS Products Security Handbook*, 555-025-600

How to Make Comments About This Document

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How to Enter Commands, Display Reports, and Print Reports

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/positions [print or schedule]
list	performance attendant	[option] [print or schedule]
list	report scheduler	[print on Schedule]
change	report scheduler	[option]
remove	report scheduler	[option] = report numbers
list	aca-parameters	[print or schedule] [options]
list	measurements aca	[print or schedule]
list	measurements call-rate	[print or schedule]
list	measurements call-summary	[print or schedule]
display	meas-selection coverage	[print or schedule]
change	meas-selection coverage	
list	measurements coverage-path	[options] [print or schedule]
display	meas-selection principal	[print or schedule]
change	meas-selection principal	
list	measurements principal	[options] [print or schedule]
clear	measurements ds1	NNCSS [options]
list	measurements ds1 summary	NNCSS [options] [print or schedule]
list	measurements ds1 log	NNCSS [options] [print or schedule]
clear	measurements ds1-facility	NNCSSF [options] [print or schedule]
list	measurements ds1-facility summary	NNCSSF [options] [print or schedule]
list	measurements ds1-facility log	NNCSSF [options] [print or schedule]
list	measurements hunt-group	[option] [print or schedule]
list	performance hunt-group	[option] [print or schedule]
list	measurements modem-pool	[option] [print or schedule]
display	meas-selection route-pattern	[print or schedule]
change	meas-selection route-pattern	
list	measurements route-pattern	<pat_no> [option] [print or schedule]
list	performance summary	[option] [print or schedule]
monitor	system view1	
monitor	system view2	
list	measurements summary	[print or schedule]
list	measurements blockage pn	[option] [print or schedule]
list	measurements blockage sn	[option] [print or schedule]

Table 1-1. Traffic Measurement Commands

COMMANDS		
Action	**Object**	**Qualifier**
list	measurements load-balance total	[option] [print or schedule]
list	measurements load-balance intercom	[option] [print or schedule]
list	measurements load-balance incoming	[option] [print or schedule]
list	measurements load-balance outgoing	[option] [print or schedule]
list	measurements load-balance tandem	[option] [print or schedule]
list	measurements tone-receiver detail	[option] [print or schedule]
list	measurements tone-receiver summary	[option] [print or schedule]
change	meas-selection trunk-group	
display	meas-selection trunk-group	[print or schedule]
change	meas-selection wideband-trunk-group	
display	meas-selection wideband-trunk-group	[print or schedule]
list	measurements trunk-group summary	[option] [print or schedule]
list	measurements trunk-group hourly	<tgn> [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]
list	measurements lightly-used-trunk	[option] [print or schedule]
list	measurements wideband-trunk-group summary	[option] [print or schedule]
list	measurements wideband-trunk-group hourly	<tgn>[print or schedule]
monitor	traffic hunt-groups	<hgn> starting group number
monitor	traffic trunk-groups	<tgn> starting group number
list	measurements occupancy summary	[print or schedule]
list	measurements occupancy last-hour	[print or schedule]
list	measurements occupancy busiest-intervals	[print or schedule]
list	measurements occupancy pktint	[print or schedule]
list	measurements communications-links	xx-yy[print or schedule]
clear	measurements occupancy	busiest - intervals
list	measurements security-violations summary	[print or schedule]
list	measurements security-violations detail	[print or schedule]
clear	measurements security-violations	
monitor	security-violations	[option] [print]

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 thirty seconds. Press **CANCEL** to cancel the **monitor** command.

NOTE:
When canceling out of some monitor commands, the G3-MT interface is automatically logged off. This is not administrable.

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.

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 range of) attendants, trunk groups, hunt groups, 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, "System Printer and Report-Scheduler", is used to administer a time/day schedule for each desired report.

Screen Format

The on screen format for reports is as follows:

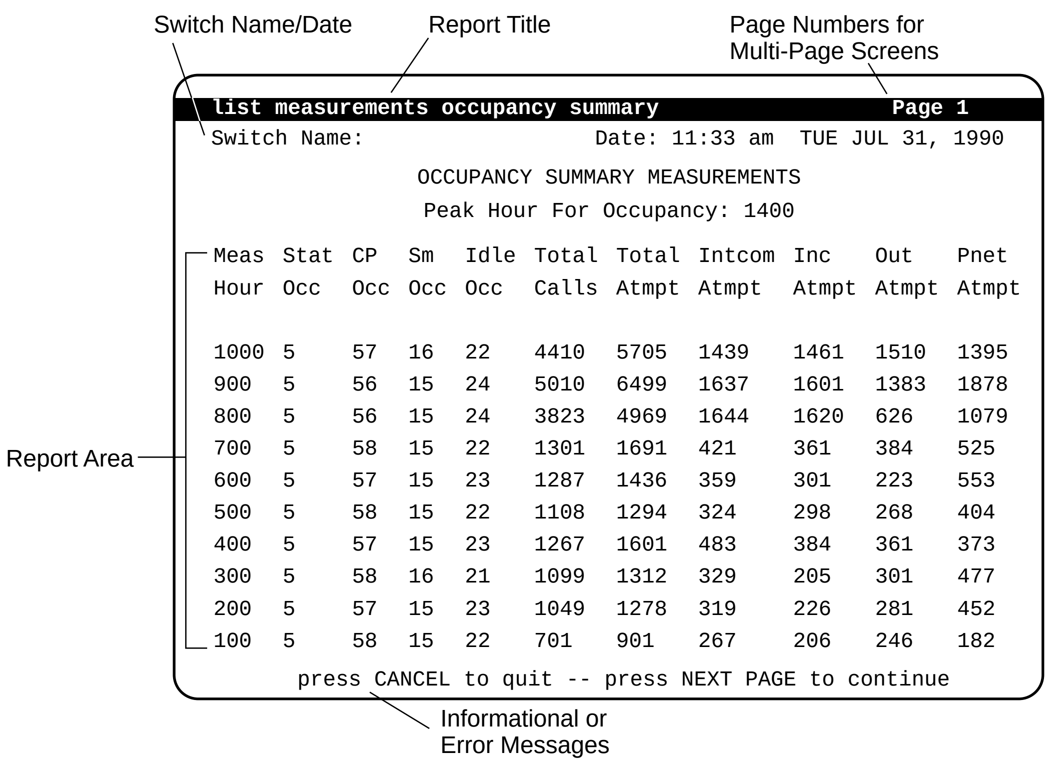

Figure 1-1. Screen Format

An error message is displayed as follows:

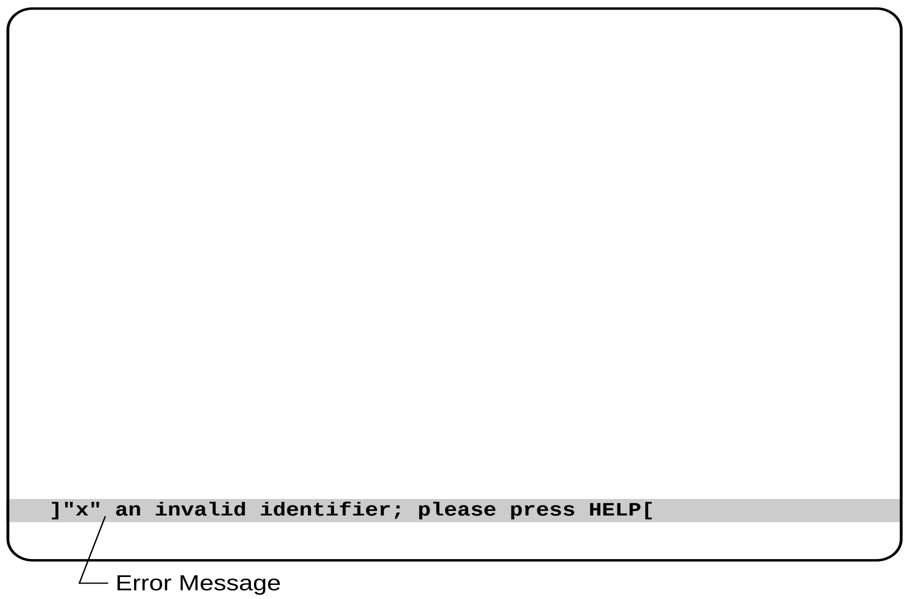

Figure 1-2. Error Message

When you type a command line it appears as follows:

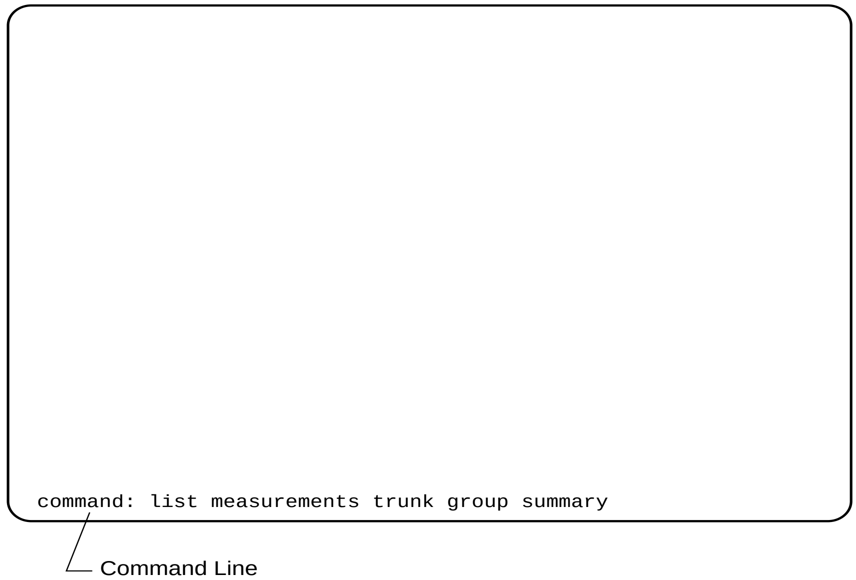

Figure 1-3. Command Line

Command Structure

A common command structure is shared across the G3s V4, G3i V4, and G3r V4 machines. The next table lists the categories of commands on the specified machines. Not listed are the *list measurements* commands. See Table 1-2 for these.

Table 1-2. Comparison of G3i/G3s and G3r Traffic-Related Commands

G3i/G3s Traffic-Related Commands			G3r Traffic-Related Commands		
Action	**Object**	**Qualifier**	**Action**	**Object**	**Qualifier**
change	meas-selection	coverage	change	meas-selection	coverage
change	meas-selection	principal	change	meas-selection	principal
change	meas-selection	route-pattern	change	meas-selection	route-pattern
change	meas-selection	trunk-group	change	meas-selection	trunk-group
change	meas-selection	wideband-trunk-group	change	meas-selection	wideband-trunk-group
clear	measurements	ds1	clear	measurements	ds1
n/a			clear	measurements	ds1-facility
clear	measurements	security-violations	clear	measurements	security-violations
clear	measurements	occupancy busiest-intervals	clear	measurements	occupancy busiest-intervals
display	meas-selection	coverage	display	meas-selection	coverage
display	meas-selection	principal	display	meas-selection	principal
display	meas-selection	route-pattern	display	meas-selection	route-pattern
display	meas-selection	trunk-group	display	meas-selection	trunk-group
display	meas-selection	wideband-trunk-group	display	meas-selection	wideband-trunk-group
list	performance	attendant-group	list	performance	attendant-group
list	performance	hunt-group	list	performance	hunt-group
list	performance	trunk-group	list	performance	trunk-group
list	performance	summary	list	performance	summary
monitor	traffic	hunt-groups	monitor	traffic	hunt-groups
monitor	traffic	trunk-groups	monitor	traffic	trunk-groups
monitor	system	view1	monitor	system	view1
monitor	system	view2	monitor	system	view2

G3i/G3s Versus G3r Reports

This book covers all the Definity G3 performance reports. However, some differences exist between the reports available on the G3i and G3s and those available on the G3r. Table 1-3 gives these differences. Differences that are due to differences in the architecture of the G3i/G3s compared to the G3r are marked with an “n/a” in the G3i/G3s column.

Table 1-3. Comparison of G3i/G3s and G3r Traffic Reports

G3i/G3s Traffic Reports			G3r Traffic Reports		
Report	**Sub-Report**	**Type**	**Report**	**Sub-Report**	**Type**
aca		Accumulated	aca		Accumulated
attendant	group	YTL*-Peak	attendant	group	YTL-Peak
attendant	positions	YTL-Peak	attendant	positions	YTL-Peak
blockage	pn	YTL-Peak	blockage	pn	YTL-Peak
n/a			blockage	sn	YTL-Peak
call-rate		YTL-Peak	call-rate		YTL-Peak
call-summary		Hourly	call-summary		Hourly
cbc-trunk-group		YTL-Peak	cbc-trunk-group		YTL-Peak
communications-links	1-8	Hourly	communications-links	1-8	Hourly
n/a			communications-links	9-16	Hourly
coverage-path		YTL-Peak	coverage-path		YTL-Peak
ds1	log	Accumulated	ds1	log	Accumulated
ds1	summary	Accumulated	ds1	summary	Accumulated
n/a			ds1-facility	log	Accumulated
n/a			ds1-facility	summary	Accumulated
hunt-group		YTL-Peak	hunt-group		YTL-Peak
lightly-used-trunk		YTL	lightly-used-trunk		YTL
load-balance	total	YTL-Peak	load-balance	total	YTL-Peak
load-balance	intercom	YTL-Peak	load-balance	intercom	YTL-Peak
load-balance	incoming	YTL-Peak	load-balance	incoming	YTL-Peak
load-balance	outgoing	YTL-Peak	load-balance	outgoing	YTL-Peak
load-balance	tandem	YTL-Peak	load-balance	tandem	YTL-Peak
modem-pool		YTL-Peak	modem-pool		YTL-Peak
occupancy	busiest- intervals	Accumulated	occupancy	busiest- intervals	Accumulated
occupancy	last-hour	Accumulated	occupancy	last-hour	Accumulated
n/a			occupancy	pktint	Hourly
occupancy	summary	Hourly	occupancy	summary	Hourly
outage-trunk		YTL	outage-trunk		YTL
principal		YTL-Peak	principal		YTL-Peak

Table 1-3. Comparison of G3i/G3s and G3r Traffic Reports

G3i/G3s Traffic Reports			G3r Traffic Reports		
Report	**Sub-Report**	**Type**	**Report**	**Sub-Report**	**Type**
route-pattern		YTL	route-pattern		YTL
security-violations	detail	Accumulated	security-violations	detail	Accumulated
security-violations	summary	Accumulated	security-violations	summary	Accumulated
summary		YTL-Peak	summary		YTL-Peak
tone-receiver	summary	YTL-Peak	tone-receiver	summary	YTL-Peak
tone-receiver	detail	YTL-Peak	tone-receiver	detail	YTL-Peak
trunk-group	hourly	Hourly	trunk-group	hourly	Hourly
trunk-group	summary	YTL-Peak	trunk-group	summary	YTL-Peak
wideband-trunk-group	hourly	Hourly	wideband-trunk-group	hourly	Hourly
wideband-trunk-group	summary	YTL-Peak	wideband-trunk-group	summary	YTL-Peak

* YTL = yesterday, today, and last-hour report options available

System Printer and Report-Scheduler

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. Screen 2-1 depicts this screen. Table 2-1 describes the data fields for this screen.

```
change system-parameters features                Page 4 of 6 SPE A
                        FEATURE-RELATED SYSTEM PARAMETERS
SYSTEM PRINTER PARAMETERS
                  System Printer Extension: 45206 Lines Per Page: 60
                      EIA Device Bit Rate: 9600
SYSTEM-WIDE PARAMETERS
             Switch Name: System Test 2

CALL MANAGEMENT SYSTEM PARAMETERS
 Expert Agent Selection (EAS)Enabled? Direct Agent Announcement Delay:
Minimum Agent-LoginID Password Length:     Converse First Data Delay: 0
  Direct Agent Announcement Extension:   Converse Second Data Delay: 2

CALL MANAGEMENT SYSTEM PARAMETERS
                BCMS measurement Interval: hour
BCMS/VuStats Abandon Call Timer (seconds):    Validate Login IDs? n
           ACD Login Identification Length: 0   Adjunct CMS Release:

MALICIOUS CALL TRACE PARAMETERS
         Apply MCT Warning Tone? n MCT Voice Recorder Trunk Group:
```

Screen 2-1. Feature Related System Parameters Screen

NOTE:
The system printer must use an Electronic Industries Association (EIA) RS-232 asynchronous serial interface. The AT&T 475 printer or 572 printer (or compatible) meet these requirements and are recommended for use as the system printer. Depending upon the type/model of serial printer that is used, certain hardware option switch settings may have to be performed as a part of the installation procedure. Appendix B, "Printer Options" lists the

option switch settings for the AT&T 475 printer and the programmable settings for the AT&T 572 printer.

Table 2-1. 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. **NOTE:** The G3s, G3vs, and G3i may connect the printer to the EIA, if the EIA is not being used for CDR collection.
`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.
`EIA Device Bit Rate`	1200, 2400, 4800, 9600

System Printer Data Link Operation and Maintenance

Operation and maintenance of the system printer data link is significantly different from the CDR and journal printer data links. For example, the CDR 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 may be 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, re-administration 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**, **test**, 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. Screen 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
```

Screen 2-2. Report Scheduler Screen — Immediate Print Interval

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 **deferred** or **scheduled**, the system responds as appropriate with the word **deferred** or **scheduled**. Furthermore, the screen changes to the format depicted in Screen 2-3 and the administrator is prompted to enter values for the `Print Time:` and the days of the week fields. **NOTE:** 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.

Table 2-2. Report Scheduler Field Descriptions

Field	Description
`Print Time:`	Within a given hour, reports may be scheduled at 15-minute intervals (that is, xx:00, xx:15, xx:30, or xx:45). 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 measurements attendant groups                                  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
```

Screen 2-3. Report Scheduler Screen — Scheduled Print Interval

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-parameters 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, Screen 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 `immediate` just type the word scheduled 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 *DEFINITY Communications System Generic 1 and Generic 3 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, Screen 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 command. 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). Screen 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
     2              nynynyn        19:00      bcms      waiting    scheduled
          list measurements call-rate
     7              nnnnnyn        19:15      bcms      waiting    deferred
          list bcms agent 5000
     23             nnynnnn        19:15      bcms      waiting    scheduled
          list bcms agent 4000 day 09/11     09/15
```

Screen 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 may be 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: ■ Waiting—Means that the report is not scheduled for any activity during the current 15-minute time interval. ■ Print-Next—Means that the report is scheduled to be printed within the current 15-minute time interval. ■ Printing—Means that the report is currently being printed. ■ 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. Screen 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
```

Screen 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: ■ Waiting—Means that the report is not scheduled for any activity during the current 15-minute time interval. ■ Print-Next—Means that the report is scheduled to be printed within the current 15-minute time interval. ■ Printing—Means that the report is currently being printed. ■ Printed—Means that the report has been successfully printed during the current 15-minute interval. **NOTE:** The `Print Time:` and the days of the week fields may be 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.

Table 2-4. Change Report Scheduler Screen

Field	Description
`Print Interval:`	The three possible options are immediate, scheduled, and deferred. 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 may be changed as desired. 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 scheduled printing of a report.

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. Screen 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
```

Screen 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: ■ Waiting—Means that the report is not scheduled for any activity during the current 15-minute time interval. ■ Print-Next—Means that the report is scheduled to be printed within the current 15-minute time interval. ■ Printing—Means that the report is currently being printed. ■ Printed—Means that the report has been successfully printed during the current 15-minute interval.
`Command:`	The command associated with the Job Id that is being removed.
`Print Interval:`	The three possible options are immediate, scheduled, and deferred.
`Print Time:`	Within a given hour, reports may be 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

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 a typical report screen
- A table that defines all field labels in the report and, when appropriate, a "Suggested Actions" list

The following reports are provided:

- **Attendant**. Describes the traffic measurements and performance 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.
- **ARS/AAR/UDP Routing**. Describes the measurements selection form and routing pattern measurements report for the ARS, AAR, and UDP features 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 Link Performance Measurements**. Describes performance measurements for DS1C links. The reports 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 reports.
- **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 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 Summary and Tone Receiver Detailed Measurements Reports which display 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; it also provides the validation and analysis of the data provided in the reports.
- **Wideband Trunk Groups**. Describes the Wideband Trunk Group Summary and Hourly reports and the Wideband Trunk Group Selection screen.

Some Notes Concerning the Report Screens

Report Screens

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.

Time and Date Fields

The time and date that the report was requested are displayed at the top right.

When a question mark appears in the time fields, three possible explanations exist.

1. The attendant presses start immediately followed by pressing cancel.
2. Pressing start and letting calls time-out after ten seconds.
3. No staffing, but making calls.

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.

Changing the Time

If you change the time, the hour in which the time was changed will be shown on the measurements reports as `hh**`.

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 Report

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-

The Attendant Group Measurements Report consists of two sub-reports: The Attendant Group Sub-Report provides 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 (`Time Talk` plus `Time Held`) for the specified day.

Hourly 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

Screen 3-1 shows a typical 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
Grp  Meas  --------- Calls ---------  ----- Time ----  Time  Speed
Siz  Hour  Ans  Abnd Qued H-Abd Held  Avail Talk Held  Abnd   Ans(sec)
0    0 0      0    0    0    0    0       0   0    0     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
```

Screen 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 for the groups.
`Meas Hour`	*Measurement 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). **NOTE:** A pair of asterisks in the minute portion of the measurement hour indicates that the switch time was changed during the measurements interval. All measurement data for this interval is set to zero.
`Calls 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). Calls placed to individual attendant extensions or that route to an attendant via a hunt group do not increment the *Calls Ans.* counter.
`Calls Aband`	*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. **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.

Table 3-1. Attendant Group Sub-Report

Field	Description
Calls Qued	*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: ■ Until an attendant becomes available and the call is connected. ■ 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. ■ The call covers to another point in a coverage path.
`Calls H-Abd`	*Calls Held-Abandoned*. The number of calls that abandon while the caller is in hold mode. Held calls which time out and re-alert are included in the held-abandoned call count. **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.
`Time Avail`	*Time Available*. The time during which the “pos avail” lamp is lit on all attendant consoles, and the attendants are not talking on calls but are available to handle new calls. Measured in Centum (Hundred) Call Seconds or CCS. **NOTE:** An attendant can have calls on hold and still be available.
	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 X 36 CCS per hour).
	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. The time that the console is on outgoing calls will not be included in the attendant group’s `Time Avail` measurement.

Table 3-1. Attendant Group Sub-Report

Field	Description
	Attendants are not available and do not accumulate time available when: ■ The position is in Night Service ■ The position was busied-out ■ The headset is unplugged ■ The attendant is servicing a call
	Suggested Actions: 1. If the `Time Avail` plus `Time Talk` fields total to a number less than 36 CCS X 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). 2. If the `Time Avail` plus `Time Talk` fields equal 36 CCS X the number of attendants, then any time 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 usually very close to the sum of the `Time Avail` and `Time Talk` fields.

Table 3-1. Attendant Group Sub-Report

Field	Description
`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 (measured in CCS). Talk time is not started until the call is answered by the attendant. The duration of time between the call terminating at the attendant console and when the call is answered is not accumulated as either *Avail Time* or *Talk Time.* Calls that are split by the attendant do not accumulate talk time from the point when the attendant presses the start button until the call is placed. Calls that route to an attendant vi a hunt group are treated as calls to the attendant extension and therefore do not accumulate talk time. **NOTE:** 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. **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.).

Table 3-1. Attendant Group Sub-Report

Field	Description
`Time Held`	Also referred to as *Held Time*. The total amount of time (measured in seconds) that the attendants have calls on hold.
`Time Abnd`	Also referred to as *Time to Abandoned*. The average amount of time that calls spend in queue and/or ringing at the console before the callers hang up (measured in seconds). **NOTE:** Time to abandoned does not include calls that overflow the attendant group queue. $Time\ To\ Abandoned\ =$ $\dfrac{Total\ Delay\ For\ All\ Abandoned\ Calls\ (in\ seconds)}{Total\ Number\ of\ Calls\ Abandoned}$ **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. **The attendant group should be engineered so that "Time to Abandoned" approximately equals "Avg Delay"**. $Total\ Delay\ =$ $(Time\ To\ Abandoned)\ \times\ (\#\ of\ Abandoned\ Calls)\ +$ $(Speed of Answer) \times (\# of Calls Answered)$ $Avg\ Delay\ =\ \dfrac{Total\ Delay}{Calls\ Answered\ +\ Calls\ Aband}$ **NOTE:** If the average time to abandon is equal to or exceeds 9999 seconds, the value 9999 displays in the field.

Table 3-1. Attendant Group Sub-Report

Field	Description
Speed Ans (Sec)	*Speed of Answer.* The average elapsed time from when a call terminates at the attendant group to when the call is answered by an attendant (measured in seconds). The average time calls wait to ring an attendant (Queue Usage / Calls Answered). The Queue Usage is the total time that calls spend in the Attendant Queue. **NOTE:** Calls terminate either (1) directly to an attendant console and subsequently begin ringing, or (2) in the attendant queue when there are no attendant positions available. $\mathit{Speed\ of\ Answer} = \dfrac{\mathit{Total\ Delay\ For\ All\ Answered\ Calls\ (in\ seconds)}}{\mathit{Total\ Number\ of\ Calls\ Answered}}$ **NOTE:** If the average time to abandon is equal to or exceeds 9999 seconds, the value 9999 displays in the field. **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.

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.

Screens

Screen 3-2 and Screen 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
Switch Name: Customer_Switch_Name              Date: 4:46 pm WED NOV 27, 1991
                        ATTENDANT POSITIONS MEASUREMENTS
 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
```

Screen 3-2. Typical Attendant Positions Sub-Report — Page 1

```
list measurements attendant positions                             Page 2
Switch Name: Customer_Switch_Name              Date: 4:46 pm WED NOV 27, 1991
                        ATTENDANT POSITIONS MEASUREMENTS
 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
```

Screen 3-3. Typical Attendant Positions Sub-Report — Page 2

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 (in CCS). 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 (measured in seconds).
`Time Avail`	The total time the subject attendant is available to receive calls during the polling interval (measured in CCS).
`Calls Ans`	The total number of calls answered by this attendant (measured in CCS). Calls placed to an individual attendant extension or that route to an attendant via a hunt group do not increment the *Calls Ans.* counter.

Attendant Group Performance Report

The Attendant Group Performance Report gives the console attendant group average speed of answer for each hour of a 24-hour period, for either yesterday or today.

Command

To display the Attendant Group Performance Report, enter:

list performance attendant-group [option] [print/schedule]

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

Screen

Screen 3-4 and Screen 3-5 show typical screens for the Attendant Group Performance Report, using the **yesterday** option.

Page 1 of the display shows hours from 0000 (midnight) through 1100 (11:00 am), and Page 2 shows hours from 1200 (noon) through 2300 (11:00 pm). As shown at the bottom of Page 1, press CANCEL to exit the Attendant Group Performance Report, or press NEXT PAGE to see the second page.

Table 3-3 describes the data presented in the Attendant Group Performance Report.

```
list performance attendant-group yesterday                            Page  1
Switch Name: Customer_Switch_Name          Date: 1:58 pm  THU MAR 29, 1990
                           ATTENDANT SPEED OF ANSWER
Meas  ----------------Average Speed of Answer (sec) -------------   Speed
Hour  1  2  3  4  5  6  7  8  9  10  15  20  30  40  50  100  200   Ans(sec)
0                                                                     0
100                                                                   0
200                                                                   0
300                                                                   0
400                                                                   0
500                                                                   0
600                                                                   0
700  ///////                                                          3
800  /////////////                                                    5
900  /////////////                                                    5
1000 /////////////                                                    5
1100 ///////////////////                                              7
          press CANCEL to quit --  press NEXT PAGE to continue
```

Screen 3-4. Attendant Group Performance Report — Page 1

```
list performance attendant-group yesterday                         Page  2
Switch Name: Customer_Switch_Name          Date: 1:58 pm  THU MAR 29, 1990
                           ATTENDANT SPEED OF ANSWER
Meas  ----------------Average Speed of Answer (sec) -------------   Speed
Hour  1  2  3  4  5  6  7  8  9  10  15  20  30  40  50  100  200   Ans(sec)
1200 ////////////////                                                6
1300 /////////////                                                   5
1400 //////////////////////////////////                             17
1500 /////////////                                                   5
1600 /////////////////////////                                       9
1700 ////                                                            2
1800                                                                 0
1900                                                                 0
2000                                                                 0
2100                                                                 0
2200                                                                 0
2300                                                                 0
Command successfully completed
enter command:
```

Screen 3-5. Attendant Group Performance Report — Page 2

Table 3-3. Attendant Group Performance Report

Field	Description
`Meas Hour`	*Measurement Hour.* The starting time (using the 24-hour clock) of the hour during which the data was recorded.
`Speed of Answer (sec)`	*Speed of Answer* in seconds. A graphic display of the average time taken by attendants to answer calls.
`Speed Ans (sec)`	*Speed of Answer.* The average speed of answer is also displayed numerically in seconds for each hour in the report interval. **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 answer becomes unacceptable and consider adding consoles and scheduling more attendants during those hours.

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 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 X the group size. For example, with two attendant positions, this should not exceed 2 X 36 = 72 CCS for data collection.

NOTE:
The attendant can have up to six calls on hold at one time.

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 agent's normal work time), and Calls Answered from the measurements report in the following equation:

$$AWT = \left[\frac{Talk\ Time + Time\ Held\ CCS}{Calls\ Answered} \right] \times \left[\frac{100\ Seconds}{CCS} \right]$$

Example:

The typical report screen shown earlier in this section (see Screen 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 as an example, the average work time is:

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

Staffed Time

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

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

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

Attendant Offered Load

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

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

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

Example:

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

- Calls Answered = 170
- Calls Abandoned = 3

And from the calculations in the previous example:

- AWT = 27.6 Seconds

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 active 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:

$$Maximum\ Possible\ Usage = 36\ CCS \times Total\ \#\ of\ Members$$

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 servers.

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 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 Tables*, 555-104-503, 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 Infinite Queue Capacity tables (found in *DEFINITY Communications System and System 75 and System 85 Traffic Tables*, 555-104-503)
- AWT (Average Wait Time)
- 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 = 47.83 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 load closest to 47.83 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 19.3 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 3-2. The average delay of these calls can be estimated using the table shown in Figure 3-3.

WRKNG SRVRS	AVE E (AVERAGE DELAY / AVERAGE HOLDING TIME) .001	.005	.010	50	.200	.250	.300	.350	.400	.450	.500	$\boxed{.700}$	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	$\boxed{46.2}$	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 3-1. 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 3-1, 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 3-2, 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 3-2. Estimating the Percentage of Delayed Calls

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

   a. In Figure 3-3, 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 19.3 seconds. While 49.8 percent of the calls are answered immediately, the remaining 50.2 percent will have an average delay of 38.6 seconds.

WRKNG SRVRS	.001	.005	1.01	.020	.150	.200	.250	.300	.350	.400	.450	.500	$\boxed{.700}$	1.00	2.00	WRKNG SRVRS
	AVE				E (AVERAGE DELAY / AVERAGE HOLDING TIME)											
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
$\boxed{2}$	0.54	0.54	0.56	0.58	0.78	0.84	0.90	0.96	1.02	1.07	1.13	1.18	$\boxed{1.40}$	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	0.89	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	0.09	0.11	0.1	0.29	0.35	0.40	0.45	0.51	0.56	0.61	0.66	0.86	1.17	2.17	48
49	0.07	0.09	0.10	0.1 6	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	0.1 6	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 3-3. 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 = 47.83 CCS
- Assuming that the Desired Speed of Answer = 13 seconds

To determine the Average Delay in Multiples of AWT:

$$\textit{Average Delay in Multiples of AWT} =$$

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

Figure 3-4. Estimating the Average Delay of Delayed Calls

a. In the table shown in Figure 3-5, 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 47.83 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 LOAI
CLOSEST TO 43.77 CCS

Figure 3-5. 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 = 47.83 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 load during the peak hour.

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

$$\frac{47.83\ CCS}{2\ \ x\ \ 36\ CCS} \times 100 = 66\%$$

Figure 3-6. Estimating Attendant Position Requirements

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 malfunctioning 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 threshold administered for a trunk group, or the duration of a call exceeds the administrated long holding time limit for the trunk group, 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 3 V4 Feature Description*, 555-230-204, 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 may be 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 terminate. For DCS networks, one switch (the primary) is administered to receive ACA referred calls from

remote nodes in the network 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. 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-*# on n***] [print/schedule**]

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

Screen

Screen 3-6 shows a typical screen for the ACA Parameters Report. Table 3-4 describes the data fields presented in the ACA Parameters Report screen.

```
list aca-parameters
                             ACA PARAMETERS CENTER
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:
```

Screen 3-6. Typical ACA Parameters Report

Table 3-4. ACA Parameters Report

Field	Description
`Group Number`	A unique number (assigned during administration) that identifies each trunk group. It may be any number within the range of one to the maximum number of trunk groups supported by the system.
`TAC`	The Trunk Access Code (assigned during administration) for the trunk group.
`Group Type`	The type of trunk. The system allows the following trunk types: ■ Access (`access`) ■ Advanced Private Line Termination (`aptl`) ■ Central Office (`co`) or Public Network Service ■ Customer Provided Equipment (`cpe`) ■ Digital Multiplexed Interface-Bit Oriented Signaling (`dmi-bos`) ■ Direct Inward Dialing (`did`) ■ Direct Inward/Outward Dialing (`diod`) ■ Foreign Exchange (`fx`) ■ Integrated Services Digital Network (`isdn-pri`) ■ Release Link Trunk (`rlt`) ■ Tandem (`tan`) ■ Tie Trunk (`tie`) ■ Wide Area Telecommunications Service (`wats`) **NOTE:** Refer to the *DEFINITY Communications System Generic 3 V4 Implementation*, 555-230-653B, for a complete definition of these trunk group types.
`Group Name`	The trunk group identification that is administered on the Trunk Group form.

Table 3-4. ACA Parameters Report

Field	Description
`ACA On?`	Indicates whether or not the trunk group is being monitored by ACA. **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: ■ The list performance trunk-group ■ The list performance summary ■ The list measurements outage-trunk ■ The list measurements trunk-group summary or hourly
`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. 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. A referral call is placed as soon as a single long holding call is detected.

ACA Measurements Report

The ACA Measurements Report displays the audit trail list of short and long holding time referral calls that have been placed.

Command

To display the ACA Measurements Report, enter:

list measurements aca [print/schedule]

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

Screen

Screen 3-7 and Screen 3-8 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 Screen 3-7, 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.

NOTE:
For wideband calls that consume more than 64 kbps of bandwidth, only the lowest numbered B-channel is shown on the ACA Measurements report. In addition, on the report, entries that pertain to referral calls associated with wideband facilities will be designated by a "w" in the right most position of that report entry.

NOTE:
If the ACA measurements report contains entries for referral calls pertaining to wideband facilities the sub title (w = Wideband Support) will append to the report title.

Table 3-5 describes the data fields presented in the ACA Measurements Report screen.

```
list measurements aca                                             Page  1
Switch Name: Cust_Switch_Name                     Date: 2:11 pm TUE May 1, 1990
Automatic Circuit Assurance Measurements (W=Wideband Support
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
```

Screen 3-7. ACA Measurements Report Screen — Page 1

```
list measurements aca                                             Page  2
Switch Name:  Cust_Switch_Name                    Date: 2:11 pm TUE May 1, 1990
Automatic Circuit Assurance Measurements (W=Wideband Support)
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            43               353             2           Long  W
16/11:46            60               384             7           Long
Command successfully completed
enter command:
```

Screen 3-8. ACA Measurements Report Screen — Page 2

Table 3-5. 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 call was reached and a referral call was placed (see Table 3-4 for definitions of short and long holding times and the short threshold counter). Expressed as: day of the current month/hour:minute The report lists referral calls beginning with the most recent and continuing back in time until either all referrals are listed or the most recent 64 are listed. A referral call is completed if the call is answered. A call that is not answered will be attempted again at the top of the next hour and each subsequent hour until it is answered or when a new ACA call is received.
`Trunk Group No.`	Number of the trunk group the referral call was placed. **NOTE:** 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.

Table 3-5. ACA Measurements Report

Field	Description
`Trunk Member`	The specific trunk in the group that experienced the short or long holding time infraction. This information can be used, with other maintenance tests, to identify the equipment location (circuit pack) of the trunk group member. For wideband trunk groups, the number shown is the lowest numbered trunk used in the wideband call.
`Type of Referral`	Indicates whether the referral occurred as the result of too many *short* holding time calls or an excessively *long* holding time call. **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.In addition, an excessively long holding call may indicate a security breach. Resolution of the problem 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.
`Wideband Flag`	If the call was a wideband call, a “W” appears next to the entry. In addition, if any wideband calls appear on the report, the tag “W = Wideband Support” appears in the report heading.

ARS/AAR/UDP Route Pattern Selection

Automatic Route Selection (ARS), Automatic Alternate Routing (AAR), and the Uniform Dial Plan (UDP) are features that route calls over public and private networks. To route the calls, ARS, AAR, and UDP select a routing pattern. A routing pattern is a list of trunk groups and a set of parameters that define the conditions under which each trunk group should be chosen to route calls.

There are two measurement screens related to routing patterns. The Route Pattern Measurement Selection screen displays the list of patterns that are to be measured. The Route 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/AAR/UDP Route Pattern Measurements Selection Form

You can select route patterns for measurement.

Commands

To display the list of route patterns that are to be measured, enter:

display meas-selection route-pattern [print/schedule]

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

change meas-selection route-pattern

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, AAR, or UDP features. This procedure is fully described in the *Implementation* manual.

Screen

Screen 3-9 shows a typical Route Pattern Measurements Selection form containing entries for the 25 patterns to be measured. Table 3-6 describes the data fields presented in the Route Pattern Measurements Selection Form.

```
change meas-selection route-pattern
                     ROUTE PATTERN 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: _____
```

Screen 3-9. Route Pattern 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 aborted by pressing CANCEL.

Table 3-6. Route Pattern Measurements Selection Form

Field	Description
Pattern No.	*Pattern number*. Lists the numbers of the 25 patterns selected for measurement.

ARS/AAR/UDP Route Pattern Measurements Report

The Route Pattern Measurements Report contains usage measurements for each of the 25 selected routing patterns. 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 Route Pattern Measurements Report, enter:

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

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

Type the identifying number of the pattern you wish to display. This number must previously have been assigned to one of the 25 numbers on the meas-selection route-pattern form. In order to obtain data for the pattern, it must previously have been administered on the ARS/AAR/UDP 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 route pattern 27, enter:

list measurements route-pattern 27 yesterday

Screen

Screen 3-10 shows a typical screen for the Route Pattern Measurements Report. Table 3-7 describes the data fields presented in the report.

```
list measurements route-pattern 1 last-hour
Switch Name: Cust_Switch_Name                  Date:  1:54 pm MON SEP 16, 1991
                  ROUTE PATTERN MEASUREMENTS (W=Wideband Support)
Pat.   Queue   Calls     Calls     Calls     Calls    Queue
No.    Size    Offered   Carried   Blocked   Queued   Ovflo.
1      5       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  isdn-pri  22      two     //////////////////////////////    100   7     W
```

Screen 3-10. Routing Pattern Measurements Report Screen

Table 3-7. Route Pattern Measurements Report

Field	Description
Pat. No.	*Pattern number*. The number of the route pattern being measured.
Queue Size	The size (length) of the queue for the first trunk group in the route pattern. This is commonly referred to as the route 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 one time.
Calls Offered	The total number of calls offered to the route pattern. $Calls\ Offered\ (With\ Queue)\ =\ \#\ of\ Calls\ Carried\ +$ $\#ofQueueOverflowCalls +$ $\#ofQueueAbandonCalls*$ $Calls\ Offered\ (Without\ Queue)\ =\ \#\ of\ Calls\ Carried\ +$ $\#ofCallsBlocked$
Calls Carried	The total number of seizures (for all trunk groups) in the routing pattern.

Table 3-7. Route Pattern Measurements Report

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. Specifically, a blocked call is a call that: 1. Arrives when there are no available resources 2. Arrives and gets queued 3. Arrives when the queue is full 4. Arrives and cannot queue because the queue length is set to zero 5. Cannot queue because the Automatic Callback (ACB) button is busy 6. Cannot queue because there is no ACB button
Calls 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. These calls also increment the blocked calls counter.
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 reorder signal. These calls also increment the blocked calls counter.
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 Route Pattern form. The first trunk group listed is the first selected (preference 1); the second listed is the second selected (preference 2), etc.

Table 3-7. Route Pattern Measurements Report

Field	Description
Grp Type	*Group Type*. The type of trunk in the group. The following types of trunk groups can be accessed through the route pattern: ■ Access (access) ■ Advanced Private Line Termination (aplt) ■ Local Central Office (co) ■ Direct Inward/Outward Dialing (diod) ■ Foreign Exchange (fx) ■ Integrated Services Digital Network-Primary Rate Interface (isdn-pri) ■ Tandem (tandem) ■ Tie Trunk (tie) ■ Wide Area Telecommunications Service (wats)
Grp Size	*Group Size*. The number of trunks in the group.
Grp Dir	*Group Direction*. Identifies whether the assigned trunk groups are outgoing (out) or 2-way (two). Incoming trunks are not included in route patterns.
% Calls Carried	A graphic display showing the percent of total calls carried over the route pattern by the trunk groups.

Table 3-7. Route Pattern Measurements Report

Field	Description
`% Calls`	The percent of the total calls carried over the route pattern by the trunk group. **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 by the route pattern by the 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. **NOTE:** This column displays a cumulative number; there are no peak data measurements for the route pattern reports. However, you can use the trunk group reports to display "peak" as well as other data for the trunk groups.
`Wideband Flag`	If a trunk group is administered to support wideband switching, a "W" appears next to the trunk group entry. In addition, if any of the trunk groups on the report support wideband switching, the tag "W = Wideband Support" appears in the report heading.

* See the Trunk Group Measurements Reports for this measurement

Specifically the number of offered calls includes:

1. The number of calls carried on all trunks in the route pattern.
2. The number of calls that could not queue because there were no available queue slots.
3. The number of calls that queued, but abandoned the queue before seizing a trunk.
4. The number of calls than could not be queued because the queue length was zero.

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 Route Pattern 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 Routing 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 routing pattern reports/worksheet do not identify a peak hour but do total the data for the identified time period.

The Routing Pattern Measurements Report summarizes data for the specified routing 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/AAR/UDP 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 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/AAR/UDP Routing Pattern form to make this change. A more likely scenario would be that the users, attempting to originate calls over the routing 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. Then 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 may be 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/AAR/UDP Routing Patterns.

Generally, you will want to minimize the number in the Calls Blocked column. In addition, 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 Performance 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 and Wideband Trunk Groups reports provide measurement data that relates to the Routing Pattern Measurements report. For example, the total number of calls that overflow from the first choice trunk group is listed in the "Grp Oval" field. It should be understood that, depending on how the trunk group is administered, these overflow calls are rerouted 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 (incoming, outgoing, and intercom) 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 one-hundredth of an hour) is used so the number of busy intervals X 100 will give the peak call rate for the listed hour. For example, assume that you have normal traffic 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 calls for an equivalent hour. The number of calls actually completed is normally much less than this number.

Command

To display the Call Rate Measurements Report, enter:

list measurements call-rate [print/schedule]

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

Screen 3-11 shows the Call Rate Measurements Report format. Table 3-8 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    18532          13:58:48                 193
                                     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:     1000    21560          00:00:00                 220
Busiest Interval: 1000    21560          00:00:00                 220
```

Screen 3-11. 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, 900 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 3-8. 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. **NOTE:** A pair of asterisks in the minute portion of the measurement hour indicates that the switch time was changed during the measurements interval.
`# Compl`	*Number of Calls Completed*. The total number of calls completed, or answered (including incoming, outgoing, and intercom), during the listed hour.
`Busy Int. (36 sec.)`	*Busy Interval (36 seconds)*. The 36-second interval within the listed hour that had the most calls completed. There are one hundred 36-second intervals in a 1 hour period.
`# Busy Int. Calls Compl`	*Number of Busy Interval Calls Completed*. The total number of calls completed in the listed busy interval. **NOTE:** 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. Wideband calls count as a single call.
`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.

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

Command

To display the Call Summary Measurements Report, enter:

list measurements call-summary [print/schedule]

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

Screen

Screen 3-12 shows the Call Summary Measurements Report format. Table 3-9 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
Command:
```

Screen 3-12. 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.

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

Table 3-9. 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. **NOTE:** A pair of asterisks in the minute portion of the measurement hour indicates that the switch time was changed during the measurements interval.
# 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. **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 principal extensions and PCOL groups.

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 reports 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 originally intended. A principal may be 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 3 V4 Feature Description*, 555-203-204.

Feature Interactions

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 [print/schedule]

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

change meas-selection coverage

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

list coverage paths [print/schedule]

Options: The print and schedule options are available.

Screen

Screen 3-13 shows a typical Coverage Path Measurements Selection Form containing entries for the 100 coverage paths to be measured. Table 3-10 describes the data presented in the Coverage Path Measurements Selection Form.

```
change meas-selection coverage
                           MEASURED COVERAGE PATHS
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
Command:
```

Screen 3-13. 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 3-10. 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 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/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. **starting 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 measured coverage paths will be displayed.

2. **count**

   You must provide a number between 1 and 100.

3. **external**

   This option will produce a version 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 the report to print at another time.

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

list measurements coverage-path 68 count 1 yesterday-peak

Screen

Screen 3-14 shows a typical screen for the Coverage Path Measurements Report. The time and date that the report was requested are displayed at the top right. Table 3-11 describes the data presented in the report.

```
list measurements coverage-path 68 count 1 yesterday-peak
Switch Name: Cust_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
Command:
```

Screen 3-14. Coverage Path Measurements Report Screen

Table 3-11. Coverage Path Measurements Report

Field	Description
`Path No.`	The number that identifies the measurement coverage path.
`Meas Hour`	The starting time (using a 24-hour clock) of the last hour or the hour during which the greatest number of calls were offered to the coverage path. **NOTE:** A pair of asterisks in the minute portion of the measurement hour indicates that the switch time was changed during the measurements interval.
`Calls Offrd`	The total number of calls offered to the path. **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 Active Criteria number of calls offered to this path due to the principal being active. **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.
`Bsy Criteria`	The Bust Criteria number of calls offered to this path due to the principal being busy.
`DA Criteria`	The Don’t Answer Criteria 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. **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.

Table 3-11. Coverage Path Measurements Report

Field	Description
SAC Criteria	The Send-All-Calls Criteria 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. **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 Call Back 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. **Suggested Action:** If this number appears high, verify why calls are not being answered.
Point Ans	The Point Answered total number of calls answered by the specified point.
Point Abd	The Point Abandoned total number of calls abandoned by the caller while ringing at the specified point. **Suggested Action:** If this number is high, it may be 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 PCOL 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/schedule]

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

change meas-selection principal

Screen

Screen 3-15 shows a typical Principal Coverage Measurements Selection Form containing entries for the 100 principal extensions or TACs to be measured. Table 3-12 describes the data fields presented in the Principal Coverage Measurements Selection Form.

```
change meas-selection principal
                                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
Command:
```

Screen 3-15. Principal Coverage Measurements Selection Screen

To add extension numbers, replace any existing, unneeded extension numbers. To do this, press *RETURN* until the 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 3-12. Principal Coverage Measurements Selection Form

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

Principal Coverage Measurements Report

The Principal Coverage Measurements Report contains 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-peak/yesterday-peak [print/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 to the principal.

Three options are available for this command:

1. **starting extension/tac**

   You may type the number of the extension or PCOL 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. If you don't enter a number, all the measured principals will be displayed.

2. **count**

   You must provide a **number** between 1 and 100 in this position.

3. **print** or **schedule**

   This option allows you to print the report immediately or schedule the report to print at another time.

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

list measurements principal 76068 count 3 yesterday-peak

Screen

Screen 3-16 shows a typical screen for the Principal Coverage Measurements Report. The time and date that the report was requested are displayed at the top right. Table 3-13 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:
```

Screen 3-16. Principal Coverage Measurements Report Screen

Table 3-13. 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.
`Calls Offrd`	The total number of calls offered to the principal.
`Aband`	The total number of abandoned calls, where the calling party hung up before the call was answered or sent to coverage. **Suggested Action:** If this number is high at the principal, you may need to redirect traffic. $\textit{The number of calls answered by principal} =$ $\textit{Calls Offered} - \textit{Calls Abandoned} - \textit{Calls Redirected}$
`Redir`	The total number of Redirected calls not answered by the principal and subsequently sent to coverage. **Suggestion Action:** If this number is large compared to `Calls Offrd`, investigate the reasons.
`Act Criteria`	The number of Active Criteria calls sent to coverage by this principal due to the principal being active.
`Bsy Criteria`	The number of Busy Criteria calls sent to coverage by this principal due to the principal being busy.
`DA Criteria`	The number of Don’t Answer Criteria calls sent to coverage by this principal because the principal didn’t answer the call after the administered number of rings. To find the number of rings, execute 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.

Table 3-13. Principal Coverage Measurements Report

Field	Description
SAC Criteria	The number of Send All Calls Criteria 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 Call Back 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. **NOTE:** This command will display other principals using some coverage paths.

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 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 Rate 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 Seconds, Bursty-Errored Seconds, Severely-Errored Seconds, and Failed Seconds 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 the bits used to frame on the DS1 signal.

Slip. An error that is detected as the deletion or repetition of a single frame. The error is caused by clock differences between systems due to improper synchronization.

Extended Superframe Format (ESF) CRC-6 Error. A data communications error over a DS1 link using the ESF format that is detected as a mismatch between the calculated CRC-6 (6-bit cyclic 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.

The percent of Error Free Seconds (%EFS) is defined as:

$$\%EFS = \left[1 - \frac{Errored\ Seconds}{Total\ Seconds}\right] \times 100$$

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 ten or more consecutive severely-errored seconds are detected. A Failed Second state is cleared when no severely-errored seconds are detected for a period of 10 consecutive seconds.

Controlled Slip Second. Any second with one or more controlled slips (a replication or deletion of a DS1 frame by the receiver).

Loss of Frame Count. The number of times a loss of frame is declared. A loss of frame is declared when there is a continuous loss of signal or out of frame condition for greater than 2.5 seconds.

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

If the misframe or slip errors become too severe, an alarm is raised. The actual rate at which the errors occur determines whether the alarm is minor or major. *DEFINITY Communications System Generic 3r V1,V2, V3 and V4 Maintenance*, 555-230-105, and the *DEFINITY Communications System Generic 1, Generic 3i, Generic 3i-Global, and Generic 3i V4 Maintenance*, 555-204-105, identify the recommended procedures that maintenance personnel should perform to resolve these alarms.

The error event data, collected by the DS1 Interface circuit pack, is available for up to 24 hours in 15-minute increments. Measurement data older than 24 hours is overwritten by the current measurement data.

A system re-boot 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 log NNCSS

This command uses the following qualifiers:

NN	=	Port network number
C	=	Carrier
SS	=	Slot

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 that the pack is removed. In addition, if a TN767E or TN464F or later suffix circuit pack that is administered for ESF framing is removed or taken out of service, data for the entire 24-hour collection period will be lost since ESF measurements are stored on the board rather than in switch memory.

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.

NOTE:
The error message “Measurements command has timed out. See Traffic Reports manual (555-230-511).” indicates that no response was received from the DS1 circuit pack. Try the command again (maximum of two more times). Note, however, that this error message may be returned from a “list measurements ds1” or “clear measurements ds1” command that uses the “remote” option, for example, “list measurements ds1 summary 1c19 remote”, if Interface Unit (IU) equipment in the network is deliberately configured not to respond to ESF performance measurements message inquiries. This is a common network setup and should be considered normal. In this case, the command will never succeed. If, however, this error message is displayed when the network or far-end PBX should be responding to the remote ESF performance measurements inquiries, then the IU itself could have problems or there could be problems on the Facility Data Link span. If the command times out three times, and the configuration is one where a reply to the request should be returned, the problem should be escalated to Tier III.

Command

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

list measurements ds1 summary NNCSS [local/carrier-local/remote] [print/schedule]

This command uses the following qualifiers:

NN	=	Port network number
C	=	Carrier
SS	=	Slot
local	=	Causes the report to display user (local) measurements. These are the user copies of the local (near-end) performance measurements and can be cleared by the user. These measurements cannot be cleared by the carrier.
carrier-local	=	Causes the report to display carrier (network) measurements. These are the carrier copies of the local (near-end) performance measurements. They can only be cleared by the carrier.
remote	=	Causes the report to display remote CSU measurements. These measurements are available from the CSU at the far end of the link. They can be cleared from the near end of the link.

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

NOTE:
The “local/carrier-local/remote” options apply only to circuit boards supported in G3V3 and later releases, specifically the TN767E and TN464F or later suffix circuit boards that are administered for ESF framing.

Screen

Screen 3-17 shows a typical screen for the DS1 Link Performance Measurements Summary Report. Table 3-14 describes the data fields presented in DS1 Link Performance Measurements Summary Report.

```
list measurements ds1 summary 1c05
Switch Name: Cust_Switch_Name             Date: 17:59 pm WED APR 13, 1994

               DS-1 LINK PERFORMANCE MEASUREMENTS SUMMARY REPORT

                               Counted Since: 4:27 pm WED APR 13, 1994
  Valid 15-Minute Intervals in Last 24 Hours: 6
         Seconds Elapsed In Current Interval: 135   ESF Error Events: 0
  Test: far-csu-loopback             Pattern: 3-in-24   Synchronized: y
         Loopback/Span Test Bit-Error Count: 53      Test Duration: 00:13:26

                             Worst 15-Minute Interval  24-Hour  Current
            Category           Date   Time   Count    Count    Interval Count
             Errored Seconds    4/13  16:42  68        133      24
      Bursty Errored Seconds    4/13  17:57  540       636      0
    Severely Errored Seconds    4/13  17:57  0         0        0
  Unavailable/Failed Seconds    4/13  17:57  3         5        0
     Controlled Slip Seconds    4/13  17:57  100       167      5
         Loss Of Frame Count    4/13  17:57  2         2        0
```

Screen 3-17. DS1 Link Performance Measurements Summary Report Screen

NOTE:
ESF Error Events, Test, Pattern, Synchronized, Loopback/Span Test Bit-Error Count, Test Duration, Controlled Slip Seconds, and Loss Of Frame Count apply only to the TN767E and TN464F or later suffix circuit boards.

Table 3-14. DS1 Link Performance Measurements Summary Report

Field	Description
`Counted 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 this field after the system clock is set. Because the Counted Since field is calculated based on the current time, an error message results if the system clock has not been set following a system reinitialization.
`Valid 15-Minute Intervals in Last 24 Hours:`	The total number of 15-minute intervals (0 to 96) in the past 24-hour period that have valid values. (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.)
`Seconds Elapsed In Current Interval:`	The number of seconds (0 to 899) that have been counted in the current 15-minute interval.
`ESF Error Events:`	The number of ESF errors (CRC-6 errors or out-of-frame errors) that have been counted with a maximum cumulative value of 65535l.
`Test`	The type of DS1 loopback/span test currently active. None indicates that no test is currently active.
`Pattern`	The type of bit pattern being generated during an extended duration DS1 loopback/span test. None indicates that no pattern is being sent.
`Synchronized`	Indicates whether the test pattern being generated by the DS1 board is synchronized (being detected properly by the receiving DS1 circuit pack). N/A will be displayed if no pattern is being generated.
`Loopback/Span Test Bit-Error Count:`	The number of bit-errors detected in the received signal when an extended duration loopback test has been performed.

Table 3-14. DS1 Link Performance Measurements Summary Report

Field	Description
`Test Duration`	The duration in seconds that the extended loopback test has run. The maximum value is 99:59:59 (99 hours, 59 minutes, and 59 seconds).
`Errored Seconds`	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 the circuit pack was not inserted during the interval.
`Bursty Errored Seconds`	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. **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 Errored Seconds`	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. N/A indicates that the count for that interval was not available. **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.
`Unavailable/ Failed Seconds`	A count of one-second intervals during which service is unavailable (0 to 900).
`Controlled Slip Seconds`	The number of seconds (0 to 255—counts greater than 255 are still displayed as 255) with one or more controlled slips (a replication or deletion of a DS1 frame by the receiver).

Table 3-14. DS1 Link Performance Measurements Summary Report

Field	Description
`Loss of Frame Count`	The accumulation of the number of times a loss of frame is declared (0 to 255—counts greater than 255 are still displayed as 255). A loss of frame is declared when there is a continuous loss of signal or out of frame condition for greater than 2.5 seconds. The condition is cleared after 15 seconds without a loss of signal or out-of-frame condition.
`Worst 15-Minute 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 0 with the most recent interval.
`24-Hour Count`	The total count in each error category for the last 24-hour period (0 to 65535 — counts greater than 65535 are still displayed as 65535). Refer to the DS1 log report to view the last 96 intervals.
`Current Interval Count`	The count 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 0. 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.

Command

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

list measurements ds1 log NNCSS [local/carrier-local/remote] [print/schedule]

This command has the following qualifiers:

NN	=	Port network number
C	=	Carrier
SS	=	Slot
local	=	Causes the report to display user (local) measurements. These are the user copies of the local (near-end) performance measurements and can be cleared by the user. These measurements cannot be cleared by the carrier.
carrier-local	=	Causes the report to display carrier (network) measurements. These are the carrier copies of the local (near-end) performance measurements. They can only be cleared by the carrier.
remote	=	Causes the report to display remote CSU measurements. These measurements are available from the CSU at the far end of the link. They can be cleared from the near end of the link.

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

NOTE:
The “local/carrier-local/remote” options apply only to circuit boards supported in G3V3 and later releases, specifically the TN767E and TN464F circuit boards that are administered for ESF framing.

NOTE:
The errored event records for TN767E and TN464F or later suffix circuit packs that are administered for ESF framing are displayed starting from most recent interval. Measurements for previous suffix TN767 and TN464 boards and for later suffix boards that are administered for D4 framing are displayed from oldest to newest interval.

Screen

Screen 3-18 and Screen 3-19 show a typical screen for the DS1 Link Performance Measurements Detailed Log Report. Table 3-15 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: 10:44 pm  WED AUG 31, 1994

             DS-1 LINK PERFORMANCE MEASUREMENTS DETAILED LOG REPORT

                   Counted Since:10:42 am  TUE AUG 30, 1994

       Date    Time        ES      BES     SES     UAS/FS CSS     LOFC
       08/30  10:57       0__     0__     0__     0__     N/A     N/A
       08/30  11:12       0__     0__     0__     0__     N/A     N/A
       08/30  11:27       0__     0__     0__     0__     N/A     N/A
       08/30  11:42       0__     0__     0__     0__     N/A     N/A
       08/30  11:57       0__     0__     0__     0__     N/A     N/A
       08/30  12:12       0__     0__     0__     0__     N/A     N/A
       08/30  12:27       0__     0__     0__     0__     N/A     N/A
       08/30  12:42       0__     0__     0__     0__     N/A     N/A
       08/30  12:57       0__     0__     0__     0__     N/A     N/A
       08/30  13:12       0__     0__     0__     0__     N/A     N/A
       08/30  13:27       0__     0__     0__     0__     N/A     N/A
```

Screen 3-18. DS1 Link Performance Measurements Detailed Log Report Screen — Page 1

```
list measurements dsl log 1c05                                  Page 2
Switch Name: cust_switch_name_____             Date: 12:15 pm  WED SEP 14,
1994

             DS-1 LINK PERFORMANCE MEASUREMENTS DETAILED LOG REPORT

                   Counted Since: 10:42am  TUE AUG 30, 1994

       Date    Time        ES      BES    SES     UAS/FS  CSS     LOFC

       08/30  13:42       0__     0__    0__     0__     N/A     N/A
       08/30  13:57       0__     0__    0__     0__     N/A     N/A
       08/30  14:12       0__     0__    0__     0__     N/A     N/A
       08/30  14:27       0__     0__    0__     0__     N/A     N/A
       08/30  14:42       0__     0__    0__     0__     N/A     N/A
       08/30  14:57       0__     0__    0__     0__     N/A     N/A
       08/30  15:12       0__     0__    0__     0__     N/A     N/A
       08/30  15:27       0__     0__    0__     0__     N/A     N/A
       08/30  15:42       0__     0__    0__     0__     N/A     N/A
       08/30  15:57       0__     0__    0__     0__     N/A     N/A
       08/30  16:12       0__     0__    0__     0__     N/A     N/A
```

Screen 3-19. DS1 Link Performance Measurements Detailed Log Report Screen — Page 2

Table 3-15. DS1 Link Performance Measurements Detailed Log Report

Field	Description
`Date`	The date of the 15-minute interval.
`Time`	The ending time for the 15-minute interval.
`ES`	*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 the circuit pack was not inserted during the interval.
`BES`	*Bursty Errored Seconds*. 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. **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.
`SES`	*Severely Errored Seconds*. 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. N/A indicates that the count for that interval was not available. An error count of this severity results in a major alarm. **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.

Table 3-15. DS1 Link Performance Measurements Detailed Log Report

Field	Description
UAS/FS	*Unavailable/Failed Seconds*. The number of seconds that the link was in the failed seconds state for the specified interval (maximum of 900). A failed second state exists any time that 10 or more consecutive severely-errored seconds have occurred. N/A indicates that the count for that interval was not available. An error count of this severity results in a major alarm. **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.
Controlled Slip Seconds	The number of seconds (maximum of 255) with one or more controlled slips (a replication or deletion of a DS1 frame by the receiver).
Loss of Frame Count	The accumulation of the number of times a loss of frame is declared (maximum of 255). A loss of frame is declared when there is a continuous loss of signal or out of frame condition for greater than 2.5 signals. The condition is cleared after 15 seconds without a loss of signal or out-of-frame condition.

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. These reports are available only on the G3r switch.

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

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

There are two DS1 Converter Link Performance Measurements sub-reports:

1. The DS1 Converter Link Performance Measurements Summary Report provides information about the worst 15 minutes, the last 24 hours, and the current 15 minutes for each type of measurement.

2. The DS1 Converter Link 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 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.

The percent of Error Free Seconds (%EFS) is defined as:

$$\%EFS = \left[1 - \frac{Errored\ Seconds}{Total\ Seconds}\right] \times 100$$

Figure 3-7. Estimating Attendant Position Requirements

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 ten or more consecutive severely-errored seconds are 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 Generic 3r V1 through V4 Maintenance*, 555-230-105, and the *DEFINITY Communications System Generic 1, Generic 3i, Generic*

3i-Global, and Generic 3i V4 Maintenance 555-204-105, identify 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 re-boot 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-facility NNCSSF

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 clear the DS1C measurements, enter:

clear measurements ds1-facility NNCSSF [print/schedule]

This command uses the following qualifiers:

NN	=	Port network number
C	=	Carrier
SS	=	Slot
F	=	Facility number

This command is not available on the G3i and G3s versions of the switch. In addition, 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.

To display the DS1C Performance Measurements Summary, enter:

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

This command uses the same qualifiers 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/schedule]

This command uses the same qualifiers as the “clear measurements” command above.

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

Screens

Screen 3-20 shows a typical screen for the DS1-Facility Summary report; Screen 3-21 and Screen 3-22, a typical screen for the DS1-Facility Detailed Log report. Table 3-16 provides details about the fields in the DS1-Facility Summary report; Table 3-17, about the DS1-Facility Log report.

```
list measurements dsl-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
```

Screen 3-20. DS1-Facility Summary Report Screen

Table 3-16. 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. The counters are set to 0 and start accumulating data when the system is administered or re-initialized. The current system time appears in this field after the system clock is set. 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.
`Number of Seconds Elapsed Into Current 15-min Interval`	The number of seconds (0 to 899) 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 96) in the past 24-hour period that contain valid data. **NOTE:** 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 most recent interval.
`Total of 24-Hour Count`	The total count in each error category for the last 24-hour period (0 to 65535 — counts greater than 65535 are still displayed as 65535). Refer to the DS1C log report to view the last 96 intervals.
`Current15-Min Interval 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, then the field will display `N/A`.

```
list measurements ds1-facility log le21a                              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    SECOND     ERR SEC     ERR SEC     SECOND     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
```

Screen 3-21. DS1-Facility Log Report Screen — Page 1

```
list measurements ds1-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
```

Screen 3-22. DS1-Facility Log Report Screen — Page 2

Table 3-17. DS1C Performance Measurements Detailed Log Report

Field	Description
`Date`	The time and date of the current report.
`Counted 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 errored 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 the circuit pack was not inserted during that interval.
`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. **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.

Table 3-17. DS1C Performance Measurements Detailed Log Report

Field	Description
`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. N/A indicates that the count for that interval was not available. An error count of this severity results in a major alarm. **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.
`Failed Second`	The value of the failed seconds counter for the specified interval (maximum of 900). A failed second state exists any time 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. **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.
`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. **NOTE:** 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.

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 yesterday’s 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/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

Screen 3-23 shows a typical screen for the Hunt Group Measurements Report, using the last-hour option. The time and date that the report was requested is displayed at the top right.

Table 3-16 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
Grp Grp           Grp  Grp  Meas  Total Calls Calls Que Calls Que  Time  Speed
No. Name          Siz  Typ  Hour  Usage Ans.  Aban. Siz  Que. Ovfl Avail Ans(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  1200  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
```

Screen 3-23. Hunt Group Measurements Report Screen

Table 3-18. Hunt Group Measurements Report

<table>
<tr><th>Field</th><th>Description</th></tr>
<tr><td><code>Grp No.</code></td><td>Group Number. A number that identifies each hunt group.</td></tr>
<tr><td><code>Grp Name</code></td><td>Group Name. Name assigned, during administration, to the hunt group.</td></tr>
<tr><td><code>Grp Siz</code></td><td>Group Size. The number of extensions assigned to the hunt group (not necessarily staffed).</td></tr>
<tr><td><code>Grp Typ</code></td><td>Group Type. Identifies the type of hunt group, which may be one of the following:
■ DDC - direct department calling
■ UCD - uniform call distribution
■ EAD - expert agent distribution</td></tr>
<tr><td><code>Meas Hour</code></td><td>Measurement Hour.</td></tr>
<tr><td><code>Total Usage</code></td><td>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:
$Maximum\ Possible\ Usage = 36\ CCS \times Total\ \#\ of\ Members$
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 may be acceptable if the personnel perform other duties.
NOTE:
ACD hunt groups that have been administered to support Multiple Call Handing will display a series of 5 asterisk (*****) in the total usage field. This measurement is not collected for ACD hunt groups that support Multiple Call Handling.</td></tr>
<tr><td><code>Calls Ans.</code></td><td>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.</td></tr>
</table>

Table 3-18. Hunt Group Measurements Report

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. **NOTE:** 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. **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. **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 fact that a larger than expected number of `Queue Ovfls` occurred.
`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.

Table 3-18. Hunt Group Measurements Report

Field	Description
`Queue Ovfl.`	*Queue Overflow*. The number of calls that arrive when all slots in the hunt group queue are occupied.
`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. 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. **NOTE:** ACD hunt groups that have been administered to support Multiple Call Handing will display a series of 5 asterisk (*****) in the total usage field. This measurement is not collected for ACD hunt groups that support Multiple Call Handling.
`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 X the group size. For example, with a hunt group containing two extensions, total usage measured should not exceed 2 X 36 = 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 similarities 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 the group that answers the call. But, 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 when 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 when a hunt group member is on an incoming or outgoing personal call.

Differences Between Non-ACD and ACD Hunt Groups

For Non-ACD Hunt Groups

1. *Calls 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.
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. *Calls 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 Avail*—Not accumulated for ACD calls that go to coverage.
5. *Total Usage*—Not accumulated for ACD calls that go to coverage.

Total Usage

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

$$Total\ Holding\ Time\ (in\ seconds) = \sum of\ the\ individual\ Holding\ Time\ (in\ sec)$$

$$Total\ Usage\ (in\ seconds) = Total\ Holding\ Time\ (in\ seconds)$$

Figure 3-8. Estimating Attendant Position Requirements

For demonstration purposes, we will consider a hunt group with 3 calls. Assume that the call durations were of 480, 300, and 220 seconds.

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

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

$$Total\ Usage\ (CCS) = 10\ CCS$$

Figure 3-9. Estimating Attendant Position Requirements

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:

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

Figure 3-10. Estimating Attendant Position Requirements

For demonstration purposes, we will consider the following calculations.

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

$$Average\ Holding\ Time = 333\ seconds\ (or\ 5\ minutes\ \text{and}\ 33\ seconds\ per\ call)$$

Figure 3-11. Estimating Attendant Position Requirements

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.

Command

To display the Hunt Group Performance Report, enter:

list performance hunt-group [options] [print/schedule]

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

Screen

Screen 3-24 shows a typical screen for the Hunt Group Performance Report, using the **yesterday** option.

Table 3-19 describes the data fields presented in the Hunt Group Performance Report.

```
list performance hunt-group yesterday
Switch Name: Cust_Switch_Name              Date: 6:13 pm  THU MAR 30, 1989
     Hunt Group Performance
   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   3
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
Command:
```

Screen 3-24. Hunt Group Performance Report Screen

Table 3-19. Hunt Group Performance Report

Field	Description
`Grp No.`	*Group Number*. A number that identifies each hunt group.
`Grp Size`	*Group Size*. The number of extensions assigned to the hunt group (not necessarily staffed).
`Grp Type`	*Group Type*. Identifies the type of hunt group, which may be one of the following: ■ DDC - direct department calling ■ UCD - uniform call distribution ■ EAD - expert agent distribution
`Slowest Speed of Answer (sec)`	*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).
`Speed Ans (sec)`	*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 announcement.
`Meas Hour`	*Measurement Hour* **Suggested Actions:** From analyzing Screen 3-24 you can determine 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 happens to be the peak usage hour as indicated from the list measurements hunt group yesterday-peak 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. $Daily\ Average\ = \dfrac{\sum\ of\ the\ Delays\ For\ Each\ Answered\ Call}{Total\ \#\ of\ Answered\ Calls\ (so\ far\ today)}$

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. The default is to begin the report with hunt group 1.

Because the command is constantly updating, you must press cancel key to end the report.

Screen

Screen 3-25 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 3-20 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
                      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                                     )
```

Screen 3-25. Hunt Group Status Report Screen

Table 3-20. Hunt Group Status Report

Field	Description
`#`	*Group Number*. A number that identifies the hunt groups.
`S`	*Group Size*. The number of extensions assigned to the hunt group (not necessarily staffed).
`A`	*Active Hunt Group Members*. The number of members in a group that are currently active (only) on incoming hunt group calls. **NOTE:** 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. **Suggested Actions:** 1. If the number of calls waiting (W) is too high (for example, the queue is full or approaching its maximum) it may be desirable to increase the number of active members (A). 2. If the `LCIQ` field indicates that calls are having to wait in queue too long, it may be appropriate to determine if the calls can be processed faster. Alternately, it may be 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 usage for the specified day.

Command

To display the Modem Pool Group Measurements Report, enter:

list measurements modem-pool [options] [print/schedule]

Options: 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**.

Screen

Screen 3-26 shows a typical screen for the Modem Pool Group Measurements Report. The time and date that the report was requested are displayed at the top right. Table 3-21 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
```

Screen 3-26. Modem Pool Group Measurements Report Screen

Table 3-21. 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 that identifies the modem pool 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). **NOTE:** Refer to *DEFINITY Communications System Generic 3 V3 Feature Description*, 555-203-204, 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. $Maximum\ Usage = Pool\ Size \times 36\ CCS$
Inc Usage	*Incoming Usage*. The usage in CCS for modem pool calls (originating from incoming or two-way trunks) that terminate on the switch. $Outgoing\ Usage = Total\ Usage - Inc\ Usage$
Tan Usage	*Tandem Usage*. The usage in CCS for tandem calls that used a modem pool member.
Calls Carried	The number of calls that were carried, during the polling 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. $Outgoing\ Calls = Calls\ Carried - Inc\ Calls$

Table 3-21. Modem Pool Group Measurements Report

Field	Description
`Tan Calls`	*Tandem Calls*. The number of tandem calls that used a modem pool member.
`Calls Blocked`	The number of calls that are blocked due to the unavailability of a conversion resource. **Suggested Actions:** 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. 2. An alternate option is to increase the `Pool Size`.
`Calls Overflow`	The number of calls directed to a modem pool group that overflow and terminate successfully in another group.
`% AMB`	*Percent All Modems Busy*. The percent of the time that all modem pool members were busy processing calls.

Performance Summary Report

This section describes the traffic measurements Performance Summary Report. The Performance Summary Report summarizes the Peak Hour Trunk Blocking Daily Routing Pattern traffic data, Trunks Out of Service, and Trunks Not Used. The system gives a summary report for the previous day or the current day.

Command

To display the Performance Summary Report, enter:

list performance summary [options] [print/schedule]

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

Screen

Screen 3-27 and Screen 3-28 show typical screens for the Performance Summary Report. On each screen, the time and date that the report was requested are displayed at the top right. The report displays the information both graphically and numerically. Table 3-22 describes the data fields presented in the Performance Summary Report.

```
list performance summary yesterday                                Page 1
Switch Name:  Cust_Switch_Name            Date: 4:38 pm  SAT MAY 19, 1990
                            SUMMARY PERFORMANCE REPORT
PEAK HOUR TRUNK BLOCKING                  DAILY ROUTE PATTERN 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
```

Screen 3-27. Performance Summary Report Screen (Page 1)

```
list performance summary yesterday                                Page 2
Switch Name:  Cust_Switch_Name            Date: 4:38 pm  SAT MAY 19, 1990
                          SUMMARY PERFORMANCE REPORT

      TRUNKS OUT OF SERVICE                    TRUNKS NOT USED
Grp  Trunks Out Of Service All Day      Grp  Trunks Not Used 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 trunks out of service              more trunks not used
Command successfully completed
Command:
```

Screen 3-28. Performance Summary Report Screen (Page 2)

Table 3-22. Performance Summary Report

Field	Description
PEAK HOUR TRUNK BLOCKING	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. % ATB is the percentage of time that all trunks in the trunk group were simultaneously in use during the measurement interval. % Out Blocking is the percentage of outgoing 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). **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. 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.

Table 3-22. Performance Summary Report

Field	Description
DAILY ROUTING PATTERN CALLS CARRIED	The percentage of calls carried, on a per trunk type basis by the 25 routing patterns that are selected and being measured (with the **change meas-selection route-pattern** command). The report displays the information both graphically and numerically. 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 system wide Total Calls Carried for all trunk types all day. The trunk group types for which routing pattern performance is reported in the summary report are: co, 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 misc represents all other remaining trunk group types over which ARS/AAR/UDP calls may be routed.
TRUNKS OUT OF SERVICE	Lists 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 trunks 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. **NOTE:** This measurement is a summary of the **list measurements outage-trunk** report.
TRUNKS NOT USED	Lists 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 trunks not used` 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 in any of the groups listed. **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-reports: One provides port network (PN) and port network link (PNL) data and the other provides switch node link (SNL) data. The latter report is available only on the G3r switch.

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 (load) 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 every one hundred seconds. Usage measurements for these sampled intervals are expressed in hundred call seconds or CCS. For example, any time 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 TDM usage = 483 X 36 CCS = 17,388 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 center stage configuration. Some of those time slots may be allocated for packet bandwidth, in which case 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 every one hundred seconds. Usage measurements for these sampled intervals are expressed in hundred call seconds or CCS. For example, any time 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 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.

Port Network Screen

Screen 3-29 shows a typical Blockage Study Port Network Report screen. Table 3-23 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   Peak Blockage    Time-slots Usage  Peg   Peak Blockage
1   1200  2650   5435  125   0            758      2125   3696    72  0
3   1200  7887   1581  250   0            762      6265   1272   170  0
4   1200  6199   8197  190   0            760      5862   4667   195  0
```

Screen 3-29. Blockage Study Port Network Report Screen

Table 3-23. Blockage Study Port Network Report

Field	Description
`PN`	The port network being measured.
`Hour`	Measurement Hour.
`TDM Usage:`	The total TDM time-slot usage, in CCS, for the PN being measured, during the measurement hour. This is calculated as follows: *TDM Usage = Sum of the allocated TDM time slots at the end of each 100 second interval in a measurement hour.* *TDM usage max = 483 x 36 CCS = 17,388 CCS* 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).
`TDM Peak:`	The maximum number of time-slots allocated at any one time during the measurement hour.
`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. **Suggested Action:** Generally, it is desirable to balance the traffic across port networks. 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.)

Table 3-23. Blockage Study Port Network Report

Field	Description
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. *PN LINK USAGE = Sum of the allocated PN Link time-slots at the end of each 100 second interval in a measurement hour. 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.
PNL Peak	The maximum number of time slots allocated at any one time on the port network links.
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 center stage is non-blocking in these configurations. **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.

Switch Node Screen

Screen 3-30 shows a typical Blockage Study Switch Node Report screen. Table 3-24 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 3-23 for data fields that are the same. This report is only accessible from the G3r machine.

```
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          1600         766          9800      49267       0          0
```

Screen 3-30. Blockage Study Switch Node Report Screen

Table 3-24. Blockage Study Switch Node Report

Field	Description
SN Pair	Identifiers for the two SNs connected by the SNL being measured.
Meas Hour	Measurement Hour.
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**. At the end of each 100-second interval, a snapshot is taken of the number of SNL time-slots used on each port network. *Max SNL usage = 766 x 36 CCS = 25,596*.
Switch Node Link Peg	The total count of circuit switched SNL time-slot seizure attempts during the measurement hour between the two measured SNs. This is the total peg count on **all interconnecting fibers**.

Table 3-24. Blockage Study Switch Node Report

Field	Description
`Switch Node Link Blockage`	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 Overflow`	The total number of times a call had to be routed over an alternate route. 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. This allows you to distinguish true blockage of a call from the direct route blockage. **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.
`Switch Node Link Overflow`	The total number of times a call had to be routed over an alternate route. 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. This allows you to distinguish true blockage of a call from the direct route blockage. **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 load source by call type. Knowing the load 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 composed 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 an EI board control utilization field (G3r only).

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/schedule]

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

Screen

Screen 3-31 depicts an example of a typical screen for the Port Network Load Balance Total Report screen. Table 3-25 describes the data fields presented in the Port Network Load Balance Total Peak Report.

```
list measurements load-balance total today-peak                          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      Control
PN  Hour  Usage Peg Peak Blockage Occup   Usage Peg Peak Blockage  Occup Util
1   1500   625  1522   59  0         6     1103  100  35   0         4     15
2   1500   625  1522   48  0         6     1103  100  35   0         4     15
 .
 .
 .
```

Screen 3-31. Port Network Load Balance Total Today Report Screen

Table 3-25. Port Network Load Balance Total Today Report

Field	Description
PN	Identifies the port network being measured.
Meas Hour	Measurement Hour.
TDM Usage	The total TDM time-slot usage, in CCS, for the PN being measured: *TDM Usage = Sum of the allocated TDM Time Slots at the end of each 100 second interval in a measurement hour* *TDM Total Potential 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 are not included).
TDM Peak	The maximum number of TDM time-slots allocated at any one time during the measurement hour.
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 Occ	The percent TDM Occupancy is computed as follows: *(TDM Usage/TDM Total Potential Usage) x 100* **Suggested Action:** Generally, the load 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).(Measured in CCS) *PN Link Usage = Sum of the allocated PN link time-slots at the end of each 100 second interval in a measurement hour.* *PNL Total Potential Usage = 766 x 36 CCS = 25,576 CCS*
PNL Peg	The total number of circuit switched time slot seizure attempts for the PN during the measurement hour.
PNL Peak	The maximum number of PNL time slots allocated at any one time during the measurement.

Table 3-25. Port Network Load Balance Total Today Report

Field	Description
Port Network Link Blockage	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 T1 remoting and are smaller than 16 PNs since the center stage is non-blocking in these configurations. **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.
Port Network Link Occup	The percent Port Network Link Occupancy is computed as follows: *(PN Link Usage/PNL Total Potential Usage) x 100*
Control Util (G3r only)	The fraction of the total capacity of the processor on the measured EI board. 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 EI board. When the processor is idle, it will usually read about 14%.

Port Network Load Balance Intercom Calls Report

Screen

Screen 3-32 depicts an example of a typical screen for the Port Network Load Balance Intercom Calls Report screen. Table 3-26 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      75               6221     1020
4     1200    1031     520               5754     2972
```

Screen 3-32. Port Network Load Balance Intercom Calls Report Screen

Table 3-26. Port Network Load Balance Intercom Report

Field	Description
`PN`	Identifies the port network being measured.
`Meas Hour`	*Measurement Hour*
`Intra PN Usage`	TDM time-slot usage caused by station-to-station calls between terminals 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 between terminals on the same port network.
`Inter PN Usage`	TDM time slot usage caused by station-to-station calls between terminals on different port networks. Usage is displayed in CCS.
`Inter PN Peg`	TDM time slot seizures caused by station-to-station calls between terminals on different port networks. **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 each port network pair, analyzing the distribution of data across each port network can provide insight.

Port Network Load Balance Incoming Calls Report

Screen

Screen 3-33 depicts an example of a typical screen for the Port Network Load Balance Incoming Calls Report. Table 3-27 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
```

Screen 3-33. Port Network Load Balance Incoming Calls Report Screen

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

Field	Description
PN	Identifies the port network being measured.
Meas Hour	*Measurement Hour*
Intra PN Usage:	TDM time-slot usage caused by incoming trunk calls to a station 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 on the same port network.
Incoming Usage:	TDM time-slot usage caused by calls to a station on the port network from an incoming trunk on another port network. Usage is displayed in CCS.
Incoming Peg:	The count of TDM time-slot seizures caused by calls to a station on the port network from an incoming trunk on another port network.
Outgoing Usage:	TDM time-slot usage caused by calls to a station on another port network from an incoming trunk on the measured port network. Usage is displayed in CCS.
Outgoing Peg:	The count of TDM time-slot seizures caused by calls to a station on another port network from an incoming trunk on the measured port network.

Port Network Load Balance Outgoing Calls Report

Screen

Screen 3-34 depicts an example of a typical screen for the Port Network Load Balance Outgoing Calls Report screen. Table 3-28 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
```

Screen 3-34. Port Network Load Balance Study Report Screen

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

Field	Description
`PN`	Identifies the port network being measured.
`Meas Hour`	*Measurement Hour*
`Intra PN Usage`	TDM time-slot usage caused by outgoing calls made by stations on the measured port network and serviced by outgoing trunks on the same port network. Usage is displayed in CCS.
`Intra PN Peg`	The count of TDM time-slot seizures caused by outgoing calls made by stations on the measured port network and serviced by outgoing trunks on the same port network.
`Incoming Usage`	The TDM time-slot usage resulting from outgoing calls originated at stations on another port network but serviced by trunks on the port network being measured. Usage is displayed in CCS.
`Incoming Peg`	The count of TDM time-slot seizures resulting from outgoing calls originated at stations on another port network but serviced by trunks on the port network being measured.
`Outgoing Usage`	The TDM time-slot usage resulting from outgoing calls originated at stations on the port network being measured but serviced by trunks on another port network. Usage is displayed in CCS.
`Outgoing Peg`	The count of TDM time-slot seizures resulting from outgoing calls originated at stations on the port network being measured but serviced by trunks on another port network.

Port Network Load Balance Tandem Calls Report

Screen

Screen 3-35 depicts an example of a typical screen for the Port Network Load Balance Tandem Calls Report. Table 3-29 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
```

Screen 3-35. Port Network Load Balance Tandem Calls Report Screen

Table 3-29. Port Network Load Balance Tandem Calls Report

Field	Description
PN	Identifies the port network being measured.
Meas Hour	*Measurement Hour*
Intra PN Usage	TDM usage caused by tandem trunk calls originating and terminating on the port network being measured. The usage is represented in CCS.
Intra PN peg	Count of TDM time-slot seizures caused by tandem trunk calls originating and terminating on the port network being measured.
Incoming Usage	The TDM usage resulting from tandem trunk calls originating on another port network but terminating on the port network being measured. The usage is represented in CCS.
Incoming Peg	Count of TDM time-slot seizures resulting from tandem trunk calls originating on another port network but terminating on the port network being measured.
Outgoing Usage	TDM usage resulting from tandem trunk calls originating on the port network being measured but terminating on another port network. The usage is represented in CCS.
Outgoing Peg	The count of TDM time-slot seizures resulting from tandem trunk calls originating on the port network being measured but terminating on another port network.

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 hour's 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 log on. 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

Screen 3-36 shows the Monitor System View1 report and Screen 3-37 shows the Monitor System View2 report. Table 3-30 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: 18
    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 -
```

Screen 3-36. 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: 18
  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 -
```

Screen 3-37. Monitor System View2 Report Screen

Table 3-30. 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. **NOTE:** 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. You can use the **status attendant** 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 the alarm has been acknowledged. An N indicates no acknowledgment.

Table 3-30. Monitor System View1 and View2 Reports

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. For trunk groups, the reports indicate the number of queued calls during the previously completed measurement interval for the identified trunk groups. For hunt groups, the reports indicate the number of queued calls and abandoned calls during the previously completed measurement interval for the identified trunk groups. 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 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 `%Time 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. **Suggested Actions:** 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. 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 Summary Report

The Tone Receiver Summary Measurements Report provides traffic data for Dual Tone Multifrequency (DTMF) receivers, general purpose tone detectors (GPTDs), and Call Classifiers (CCs). DTMF receivers detect touch tones, GPTDs detect call progress tones. CCs can function either as Call Progress Tone Receivers (CPTRs), touch-tone receivers (TTRs), or multifrequency compelled receivers (MFCRs).

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 3 System Description and Specifications*, 555-230-206, for additional details.

Each TN748 provides four DTMF receivers for touch-tone reception plus two GPTDs for call progress tone reception and maintenance testing. The number of TN748 circuit packs required depends upon the traffic load. Each TN744 provides eight CCs for call prompting applications or MFC detection.

Reports can be requested on tone receiver activity for yesterday's peak hour, today's peak hour, or the last hour. The peak is the hour of the day with the highest `Peak Req` measurement. 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 Summary Measurements Report screen, enter:

list measurements tone-receiver summary last-hour/today-peak/yesterday-peak [print/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

Screen 3-38 depicts an example of a typical screen for the Tone Receiver Measurements Summary Report screen. Table 3-31 describes the data fields presented in the Tone Receiver Measurements Summary Report.

```
Switch Name:                                        Date: 11:27 am  MON JUL 17, 1995
                       TONE RECEIVER SUMMARY MEASUREMENTS
      Meas             Total     Peak      Total     Peak      Total     Peak
Hour  Type             Req       Req       Queued    Queued    Denied    Denied
1000  DTMF               0         0         0         0         0         0
1000  GPTD               0         0                             0         0
1000  CC-TTR             0         0         0         0         0         0
1000  CC-CPTR            0         0                             0         0
1000  CC-MFCR            0         0                             0         0
      TR Type          Total Avail         Capabilities
      DTMR-PT             4                DTMF
      GPTD-PT             2                GPTD
      CLAS-PT             0                DTMF,CC-TTR,CC-CPTR,MFCR
      ETR-PT              0                DTMF,CC-TTR,CC-CPTR,MFCR,GPTD
Command successfully completed
Command:
```

Screen 3-38. Tone Receiver Measurements Report Screen

Table 3-31. Tone Receiver Measurements Summary Report

Field	Description
Hour	*Measurement Hour*. The starting time (using 24-hour clock) of the last hour or the hour with the highest Peak Req measurement.
Type	The type of tone receiver being measured.
Total Req	*Total Requests*. The system-wide total number of requests, by call processing, for DTMF, GPTD, CC-TTR, CC-CPTR, or MFCR receivers during the listed hour. The total number of requests is calculated by incrementing a counter for each request.
Total Avail	*Total available.* Total available receivers.

Table 3-31. Tone Receiver Measurements Summary Report

Field	Description
`Peak Req`	*Peak Requests*. The system-wide peak number of simultaneous requests for DTMF, GPTD, CC-TTR, CC-CPTR, or MFCR 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. **NOTE:** 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.
`Total Queued`	The system-wide total number of requests that were queued during the listed hour. A request is queued when there are no receivers immediately available. Only DTMF and CC-TTR requests are queued. **NOTE:** If a request for a receiver is made in one port network, and no receivers are available, then the request is offered to the next port network. If no receivers are available on any port network, then the request is queued. Queued call requests do not receive dial tone until a tone receiver becomes available.
`Peak Queued`	The system-wide maximum number of call requests that were queued at any one time during the listed hour. **NOTE:** The system has a maximum queue size of 4 for DTMF requests and 80 for CC-TTR call vectoring requests.
`Total Denied`	The system-wide total number of requests that were denied because no receivers were available during the listed hour. For DTMF-receiver or CCTR requests, this happens only after the queue is full. Those requests that are denied are given reorder tone.

Table 3-31. Tone Receiver Measurements Summary Report

Field	Description
`Peak Denied`	The system-wide peak number of requests that were denied because no receivers were available during the listed hour. **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.
`TR Type`	*Tone Receiver Type*. The tone receiver circuit boards that are in physically connected at the time of the hour measurement. **NOTE:** Each TN748 and TN420 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 (CC-CPTR), touch-tone reception (CC-TTR), or MFC (MFCR) reception and DTMF receivers.
`No. Avail`	*Number Available*. The number of the ports available for the type of tone receiver listed in the previous column.
`Capa-bilities`	The types of tone(s) that the tone receiver can detect.

Tone Receiver Detail Report

The Tone Receiver Measurements Detail Report provides traffic data for Dual Tone Multifrequency (DTMF) receivers, general purpose tone detectors (GPTDs), and Call Classifiers (CCs) as Call Progress Tone Receivers (CC-CPTRs) for call classification, as touch-tone receivers (CC-TTRs) for call vectoring, as multifrequency compelled receivers (MFCRs), and DTMF receivers.

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 3 System Description and Specifications*, 555-230-206, for additional details.

Each TN748 and TN420 circuit pack provides four DTMF receivers for touch-tone reception plus two GPTDs for call progress tone reception and maintenance testing. The number of TN748 and TN420 circuit packs required depends upon the traffic load. Each TN744 provides eight CCs for call vectoring applications, call classification, MFC detection, or basic DTMF usage.

NOTE:
In the previous version of this report (G3V3), this report provided traffic for three types of tone receiver measurements: DTMF, GPTD, and CC-TTR, CC-CPTR, and MFCR. The CC-TTR, CC-CPTR, and MFCR types were not reported individually. In this case, the measurements were associated with the circuit packs installed on the switch. In G3V3 and later, the report provides measurements for each tone receiving function independent of the hardware that provides each type of functionality.

Reports can be requested on tone receiver activity for yesterday's peak hour, today's peak hour, or the last hour. The peak is the hour of the day with the highest Peak Req measurement. 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 Detail Report screen, enter:

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

Screen 3-39 and Screen 3-40 depict an example of a typical screen for the Tone Receiver Measurements Detail Report screen for a two-port network system. Table 3-32 describes the data fields presented in the Tone Receiver Measurements Detail Report. One page of data is displayed per port network.

```
list measurements tone-receiver detail last-hour               Page  1
Switch Name: Cust_Switch_Name                      Date: 3:16 pm TUE OCT 17, 1993
                 TONE RECEIVER DETAIL MEASUREMENTS
                          PN     PN     Peak     Total    Peak
Hour    PN      Type      Req   Alloc   Alloc    Off-PN  Off-PN
1400    1       DTMF       8     8       8         0        5
1400    1       GPTD       12    12      3         0        0
1400            CC
                CC-TTR      0     0      0         0        0
                CC-CPTR     0     0      0         0        0
                CC-MFCR     0     0      0         0        0

         Press CANCEL to quit   -   press NEXT PAGE to continue
```

Screen 3-39. Tone Receiver Detailed Measurements Report Screen — Page 1

```
list measurements tone-receiver detail last-hour               Page  2
Switch Name: Cust_Switch_Name                      Date: 3:16 pm TUE OCT 17, 1993
                 TONE RECEIVER DETAIL MEASUREMENTS
                          PN     PN     Peak     Total    Peak
Hour    PN      Type      Req   Alloc   Alloc    Off-PN  Off-PN
1400    1       DTMF       8     8       8         0        5
1400    1       GPTD       12    12      3         0        0
1400            CC
                CC-TTR      0     0      0         0        0
                CC-CPTR     0     0      0         0        0
                CC-MFCR     0     0      0         0        0

Command successfully completed
Command:
```

Screen 3-40. Tone Receiver Detailed Measurements Report Screen — Page 2

Table 3-32. Tone Receiver Detailed Measurements Report

Field	Description
`Hour`	*Measurement Hour*. The starting time (using 24-hour clock) of the last hour or of the hour with the highest Peak Req measurement.
`PN`	*Port Network*. The port network in which the circuit pack containing the type of tone receiver listed is physically located.
`Type`	*Type*. The type of tone receiver being measured. **NOTE:** Each TN748 and TN420 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 (CC-CPTR), touch-tone reception (CC-TTR), or MFC (CC-MFCR) reception.
`PN Req`	*Port Network Requests*. The number of requests for DTMF, GPTD, CC-TTR, CC-CPTR, or MFCR receivers within the port network during the listed hour.
`PN Alloc`	*Port Network Total Allocation*. The total number of DTMF, GPTD, CC-TTR, CC-CPTR, or MFCR receivers located in the listed port network that were allocated for use during the listed hour.

Table 3-32. Tone Receiver Detailed Measurements Report

Field	Description
`Peak Alloc`	*Peak Allocation*. The peak number of DTMF, GPTD, CC-TTR, CC-CPTR, or MFCR receivers located in the listed port network that were in use simultaneously during the listed hour.
`Total Off-PN`	*Total Off-Port Network*. For the identified hour and port network, this is the total number of DTMF, GPTD, CC-TTR, CC-CPTR, or MFCR receivers that were allocated on a different port network for requests originated on this port network. **NOTE:** With ideal conditions, this field will display the number 0. However, with more practical conditions, the field will display a larger number. **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, CC-TTR, CC-CPTR, or MFCR receivers that were simultaneously allocated on a different port network for requests originated on this port network. **NOTE:** A desirable goal is to minimize (within reason) the number displayed with this field. **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 and TN420 circuit pack (or, if you are working with a CC-TTR, CC-CPTR, and MFCR, 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, wideband trunk group, coverage path, coverage principals, and routing-pattern time stamps for measurement selection modifications.

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/schedule]

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

Screen

Screens 3-41 through 3-43 show the Traffic Summary Report screens. Table 3-33 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
OCCUPANCY MEASUREMENTS
       Meas Hour:        700        500      1300
Static Occupancy:        7          7        0
    CP Occupancy:        0          3        5
    SM Occupancy:        18         1        16
BLOCKAGE MEASURMENTS
       Meas Hour:        700        700      2300
  Total Blockage:        0          0        0
     High PN Blk:        0          0        0
High SNL/PNL Blk:        0          0        0
ATTENDANT SPEED MEASUREMENTS
       Meas Hour:        700        700      2300
 Attendant Speed:        0          0        0
```

Screen 3-41. Traffic Summary Report Screen — Page 1

```
list measurements summary
Switch Name: Cust_Switch_Name                  Date: 8:13 am
THRU SEP 19, 1991
      TRAFFIC SUMMARY REPORT

                        TRAFFIC FLAGS
                                  Major Alarm: NO MAJOR ALARM
                           Trunk Group: 11:08 pm SEP 16, 1991
                  Wideband Trunk Group: 11:08 pm SEP 16, 1991
                         Coverage Path: 11:08 pm SEP 16, 1991
                    Covered Principals: 11:08 pm SEP 16, 1991
                         Route Pattern: 11:08 pm SEP 16, 1991
                               Total Trunks Out of Service: 4
                                       Security Violations: 0
                                       CDR High-Water-Mark: 0
                                              CDR Overflow: 0
```

Screen 3-42. Traffic Summary Report Screen — Page 2

```
list measurements summary
Switch Name: Cust_Switch_Name                  Date: 8:13 am THRU SEP 19, 1991
                               TRAFFIC SUMMARY REPORT

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
```

Screen 3-43. Traffic Summary Report Screen — Page 3

Table 3-33. Traffic Summary Report

Field	Description
Static Occupancy	*Static Occupancy.* The percentage of processor occupancy required by background processes in support of call processing, maintenance, and system management. Examples of this activity are high-level sanity checks, system timing, and polling of adjuncts.
CP Occupancy	*Call Processing Processor Occupancy*. The percentage of processor occupancy due to high priority processing and dynamic call processing. The peak hour is determined by the hour with the largest combined call processing and static occupancy. Refer to the “list measurements occupancy summary” report to correlate data as well as to determine necessary actions.
SM Occupancy	*System Management Processor Occupancy*. The percentage of processor occupancy due to system management processes. This measurement is time coincident with the peak value of the combined call processing and static processor occupancy.
Total Blockage	The percent of total circuit switched time slot seizures that were blocked due to insufficient TDM or CSS time slots. *Total Blocking = ((TDM Blockage + SNL Blockage + PNL Blockage) x 100) / (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 *Highest PN Blk = (TDM Blockage x 100) / TDM Pegs*

Table 3-33. Traffic Summary Report

Field	Description
`High PNL/SNL Blk`	*Highest PNL/SNL Blk* (G3r only). 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 *Highest PNL/SNL Blk = ((SNL Blockage + PNL Blockage) *100)) / SNL Pegs + PNL Pegs)* 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. The peak hour has the worst total (TDM, PNL and SNL) blockage.
`Attendant Speed`	*Attendant Group Speed of Service* The average time that calls are in the attendant queue. The peak hour has the slowest speed of service. *Attendant Speed = Total Delay for all Answered Call (in seconds) / Total Number of Calls Answered* **Suggested Action** If the speed of answer is not acceptable, review the attendant group and attendant positions reports for suggested actions.
`Major Alarm`	The time stamp of the last major alarm that was active when the report was generated for the last hour. **Suggested Action** If measurement data on reports seems inconsistent, further study of alarms may point to a potential problem ("display alarms").
`Trunk Group`	Time stamp that indicates when the Trunk Groups Measurement Selection form was last updated. This time stamp is retrieved when the measurements for the Trunk Group Hourly Report are collected each hour.
`Wideband Trunk Group`	Time stamp that indicates when the Wideband Trunk Group Measurement Selection form was last updated. This time stamp is retrieved when the measurements for the Wideband Trunk Group Hourly Report are collected each hour.
`Coverage Path`	Time stamp that indicates when the Coverage Measurement Selection form was last updated. This time stamp is retrieved when the measurements for the associated report(s) are collected each hour.
`Covered Principals`	Time stamp that indicates when the Principal Measurement Selection Administration Form was last updated. This time stamp is retrieved when the measurements for the associated report(s) are collected each hour.

Table 3-33. Traffic Summary Report

Field	Description
`Route Pattern`	Time stamp that indicates when the Measurement Route Pattern Selection Administration Form was last updated. This time stamp is retrieved when the measurements for the associated report(s) are collected each hour. The time at which the identification of routing patterns to be studied was last changed.
`Total Trunks Out of Service`	The total number of 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").
`Security Violations`	The total number of security violations, login, barrier code, and authorization code, as recorded in the Security Violations Summary Report. Generally, this number should not be high. If it is, refer to the Security Violations Summary and Detail Reports ("list measurements security summary" and "list measurements security detail") for suggested actions.
`CDR High Water Mark`	The number of times during the measurement interval that the CDR 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 Overflow`	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. **Suggested Actions** Both the above conditions may 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").
`Group`	The trunk group number.
`Meas Hour`	*Measurement Hour*
`% ATB`	*Percent All Trunks Busy.* The observed blocking as determined by All Trunks Busy (ATB) for the trunk group. This is reported for the 5 trunk groups with the highest % ATB for today and yesterday.

Trunk Groups

This section describes the traffic, outage, performance, status, call-by-call, and lightly used 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/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. The peak hour is the hour within a 24-hour period that had the greatest usage for the specified 24-hour period.

Screen

Screen 3-44 shows a typical screen for the Trunk Group Summary Report. Table 3-34 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 (W = Wideband Support)           %
Grp Grp  Grp  Grp Meas Total Total Inc.  Grp  Que  Calls Que Que Out   %  Out
No. Siz  Type Dir Hour Usage Seize Seize Ovfl Siz  Qued  Ovf Abd Srv  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  W
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
```

Screen 3-44. Trunk Summary Report Screen

Table 3-34. Trunk Group Summary Report

Field	Description
Peak Hour for All Trunk Groups	The hour during the specified day that has the largest total usage, when summed over all trunk groups. 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 time-coincident 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 may or may not occur during the time-coincident busy hour. These traffic reports and accompanying trunk group data worksheet only use the bouncing peak hour method. Note that if the total usage for the current hour equals the total usage for the previous peak hour, then the peak hour is the hour with the greatest number of total seizures.
Grp No.	*Group Number.* A number that identifies each trunk group associated with the displayed data. Group numbers are displayed in numerical order, beginning with the lowest administered number and continuing to the highest administered number.
Grp Siz	*Group Size*. The number of administered trunks in the trunk group.
Grp Type	*Group Type*. The type of trunk in the trunk group. The system monitors/measures the following trunk types: Access Tie Trunk (`Access`) Advanced Private Line Termination (`aplt`) Central Office (`co`) or Public Network Service Customer Provided Equipment (`cpe`) Direct Inward Dialing (`did`) Direct Inward/Outward Dialing (`diod`) Digital Multiplexed Interface Bit Oriented Signaling (`dmi-bos`) Foreign Exchange (`fx`) Integrated Services Digital Network (`isdn-pri`) Release Link Trunk (`rlt`) Tandem (`tan`) Tie Trunk (`tie`) Wide Area Telecommunications Service (`wats`)
Grp Dir	*Trunk Group Direction*. Identifies whether the trunk group is incoming (`inc`), outgoing (`out`), or two-way (`two`).

Table 3-34. Trunk Group Summary Report

Field	Description
`Meas Hour`	*Measurement Hour*. The hour (using 24-hour clock) 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).
`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 usage measures each time a trunk is seized for use by an incoming call (wether it is picked up or not) or an out going call (only after digits have been dialed).
`Total Seize`	The number of incoming and outgoing seizures carried on the trunk group. This would include the number of times a trunk in the group was seized, including false starts, don't answer and busy.
`Inc. Seize`	*Incoming Seize*. The number of incoming seizures carried on the trunk group.
`Grp Ovf`	*Group Overflow*. The number of calls offered to a trunk group that are not carried or queued (if a queue is present). Calls rejected for authorization reasons are not included.
`Que Siz`	*Trunk 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 0 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.

Table 3-34. Trunk Group Summary Report

Field	Description
`Que Ovf`	*Queue Overflow*. The total number of calls that were not queued because the queue was full. These calls receive a reorder signal. **Suggested Actions:** Generally, this field will indicate the number 0. If this field indicates a high number, then: a. The queue size may be too small, or 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: ■ By the system because they have been in the queue for more than 30 minutes ■ By the user (for example, dialing the cancel code). `Suggested Action:` 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.
`Out Srv`	*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. **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. Refer to the Trunk Outage Measurements Report for specific details.

Table 3-34. Trunk Group Summary Report

Field	Description
`% ATB`	*Percentage all trunks busy*. The percentage of time that all trunks in the trunk group were simultaneously in use during the measurement interval. **NOTE:** In use means that the trunks were busy—either serving calls, or because they were busied-out by maintenance. **Suggested Actions:** 1. If the group direction is outgoing or two-way, then a high number in the `% ATB` field and nothing in the `Grp Ovfl` or `Que Ovf` would indicate that everything is functioning normally. 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. Unless it is the last trunk group in the pattern, overflow is to the next 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. 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.

Table 3-34. Trunk Group Summary Report

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). For trunk groups without a queue, the calls not carried are those calls that arrive when all trunks are busy. The number of Outgoing Seizures is calculated as follows: $Outgoing\ Seizures = Total\ Seizures - Incoming\ Seizures$ Similarly, the equation for calculating Outgoing Calls Offered is as follows: $Outgoing\ Calls\ Offered = Group\ Overflow + Outgoing\ Seizures$ $\%\ OutBlk = \left[\frac{Group\ Overflow}{Outgoing\ Calls\ Offered}\right]$ 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: $Outgoing\ Calls\ Offered = Que\ Ovf + Que\ Abd + Outgoing\ Seizures$ $\%\ OutBlk = \left[\frac{Queue\ Overflow + Que\ Abd}{Outgoing\ Calls\ Offered}\right] \times 100$ **Suggested Actions:** 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. 2. If conditions are such that Step 1 is not appropriate, then you may find it necessary to add more trunks. **NOTE:** If you are using ARS you may see a high number in this field. This only indicates that calls are overflowing to the next choice.

Table 3-34. Trunk Group Summary Report

Field	Description
`Wideband Flag`	If the trunk group supports wideband (n X DS0) switching, a "W" appears next to the trunk group entry. In addition, if any trunk group on the report supports wideband switching, the tag "W = Wideband Support" appears in the report heading.

* The usage that wideband calls contribute to this measurement is proportional to the resources that the calls consume. For example, a 384-kbps call contributes six times more to the total usage than does a 64-kbps call.

† This measurement is incremented only once for wideband calls, regardless of the call bandwidth.

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. On the G3r, a maximum of 75 trunk groups can be studied hourly at the same time. On the G3i and G3s, a maximum of 25 trunk groups can be studied.

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.

Command

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

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

Screen

Screen 3-45 shows a typical screen for the Trunk Group Hourly Report. Table 3-35 and Table 3-36 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.

Note that if a translation change has occurred during a particular hour, an asterisk (*) appears in front the data for the hour in which the translation change occurred.

```
list measurements trunk-group hourly 40
Switch Name: Cust_Switch_Name                    Date: 1:58 pm MON SEP 16, 1991
                  TRUNK GROUP HOURLY REPORT ——— WIDEBAND Support
Grp No: 40     Grp Size: 5     Grp Type: isdn-pri  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
```

Screen 3-45. Trunk Group Hourly Report Screen

Table 3-35. Trunk Group Hourly Report (Header)

Field	Description
`Grp No.`	*Group Number*. A number that identifies the trunk group associated with the displayed data.
`Grp Size`	*Group Size*. Number of trunks in the trunk group.
`Grp Type`	*Group Type*. All trunk group types except PCOL trunk groups.
`Grp Dir`	*Group Direction*. Incoming, outgoing, or two-way.
`Que 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 3-36. Trunk Group Hourly Report (Data)

Field	Description
Meas Hour	*Measurement Hour*. The starting time (using 24-hour clock) of the hour during which the data was recorded.
Total Usage*	The total time (in CCS) 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, 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	*Maintenance Usage.* The total usage (in CCS) 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†	*Total Seizures.* The total number of seizures on the trunk group.
Inc. Seize†	*Incoming Seizures.* The number of incoming seizures on the trunk group.
Tandem Seize†	*Tandem Seizures.* The number of trunk-to-trunk call seizures. This count is incremented on the outgoing-trunk side of the connection.
Grp Ovfl†	*Group Overflow.* The outgoing calls 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.
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.
Out Serv	*Out of Service*. The number of trunks in the trunk group that were out of service at the time the data is collected.

Table 3-36. Trunk Group Hourly Report (Data)

Field	Description
`% ATB`	*Percent All Trunks Busy*. The percentage of time during the measurement interval that all trunks in the group are unavailable to carry a new call (All Trunks Busy).
`%Out Blk`	*Percent Outgoing Blocking.* The percent of the outgoing seizures, including tandem seizures, offered to that trunk group that are not carried on that trunk group. The value is calculated as follows: *% Out Blk = {Grp Ovfl / [Total Seize - Inc Seize]} x 100*
`Wideband Flag`	If the trunk group supports wideband (n X DS0) switching, "Wideband Support" appears in the report heading.

* The usage that wideband calls contribute to this measurement is proportional to the resources that the calls consume. For example, a 384-kbps call contributes six times more to the total usage than does a 64-kbps call.

† This measurement is incremented only once for wideband calls, regardless of the call bandwidth.

Trunk Group Measurement Selection Form

The Trunk Group Measurement Selection Form is used at administration time to specify the trunk groups for 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 maximum of 75 trunk groups can be studied hourly on the G3r; on the G3i and G3s, the maximum is 25. 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/schedule]

Options: The print and schedule options are available with the **display** command only.

Screen

Screen 3-46 shows a typical screen for the Trunk Group Measurement Selection Form on the G3r. Table 3-37 describes the data fields presented in the Trunk Group Measurement Selection Form.

```
display meas-selection trunk-group
                          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
```

Screen 3-46. Trunk Group Measurement Selection Screen

Table 3-37. 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/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

Screen 3-47 shows a typical screen for the Trunk Group Performance Report. Table 3-38 describes the data fields presented in the Trunk Group Performance Report.

```
list performance trunk-group yesterday
Switch Name:  Cust_Switch_Name           Date: 4:28 pm SAT MAY 19, 1990
      HIGHEST HOURLY TRUNK GROUP BLOCKING PERFORMANCE
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   did  in 10    ///////////////////////           *     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:
```

Screen 3-47. Trunk Group Performance Report Screen

Table 3-38. Trunk Group Performance Report

Field	Description
`Grp No.`	*Group Number*. A number that identifies the trunk group associated with the displayed data.
`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 3 Feature Description*, 555-203-204): ■ Access (`access`) ■ Advanced Private Line Termination (`aplt`) ■ Central Office (`co`) or Public Network Service ■ Customer Provided Equipment (`cpe`) ■ Direct Inward Dialing (`did`) ■ Direct Inward/Outward Dialing (`diod`) ■ Digital Multiplexed Interface Bit Oriented Signaling (`dmi-bos`) ■ Foreign Exchange (`fx`) ■ Integrated Services Digital Network (`isdn-pri`) ■ Release Link Trunk (`rlt`) ■ Tandem (`tandem`) ■ Tie Trunk (`tie`) ■ Wide Area Telecommunications Service (`wats`)
`Grp Dir`	*Trunk Group Direction*. Identifies whether the trunk group is incoming (`inc`), outgoing (`out`), or two-way (`two`).
`Grp Size`	*Group Size*. The number of trunks in the trunk group.
`%Out Blkg`	*Percentage Outgoing Blocking*. The percentage of calls that arrive when all trunks are busy.

Table 3-38. Trunk Group Performance Report

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). **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. 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. 2. If excessive blocking is not because of calling volume, the reason might 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. 3. For identified problems, determine whether maintenance has been or should be alerted.
`%Time ATB`	*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. **NOTE:** In use means that the trunks were busy—either serving calls, or because they were busied-out by maintenance.
`Meas Hour`	*Measurement 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/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**.

Screen

The Trunk Outage Measurements Report screen is shown in Screen 3-52. Table 3-39 describes the data fields presented in the Trunk Outage Measurements Report.

```
list measurements outage-trunk yesterday
Switch Name: Cust_Switch_Name       Date:  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
Command:
```

Screen 3-48. Trunk Outage Measurements Report Screen

Table 3-39. Trunk Outage Measurements Report

Field	Description
`Grp No.`	*Group Number*. A number that identifies each trunk group associated with the displayed data.
`Grp Type`	*Group Type*. The type of trunk associated with the accumulated data. The system monitors the following trunk types (see *DEFINITY Communications System Generic 3 V3 Feature Description*, 555-230-204): ■ Access (`access`) ■ Advanced Private Line Termination (`aplt`) ■ Central Office (`co`) or Public Network Service ■ Customer Provided Equipment (`cpe`) ■ Digital Multiplexed Interface Bit Oriented Signaling (`dmi-bos`) ■ Direct Inward Dialing (`did`) ■ Direct Inward/Outward Dialing (`diod`) ■ Foreign Exchange (`fx`) ■ Integrated Services Digital Network (`isdn-pri`) ■ Release Link Trunk (`rlt`) ■ Tandem (`tandem`) ■ Tie Trunk (`tie`) ■ Wide Area Telecommunications Service (`wats`)
`Grp Dir`	*Group Direction*. Identifies whether the trunk group is incoming (`inc`), outgoing (`out`), or two-way (`two`).

Table 3-39. Trunk Outage Measurements Report

Field	Description
`Grp Size`	*Group Size*. The number of trunks in the trunk group.
`Grp Mbr #`	*Group Member Number*. The number that identifies a specific trunk member (in the group) that is out of service.
`#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. **NOTE:** If there are no outages, then no data is displayed. **Suggested Actions:** 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. 2. If a trunk is just suspected of causing problems, you should use the ACA feature to monitor the particular trunk group. 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 load 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. To display higher numbered trunk groups, type the number of the first group of the 60 trunk groups to be displayed. Only those trunk groups that are administered are shown on the report.

Because the command is constantly updated, you must press the cancel key to cancel the command.

Screen

Screen 3-49 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 blanks. The date and time at which the report was requested are displayed to the right of the screen title. Table 3-40 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.)
```

Screen 3-49. Trunk Group Status Report Screen

Table 3-40. Trunk Group Status Report

Field	Description
#	*Group Number*. A number that identifies each trunk group.
S	*Group Size*. The number of trunks that are administered for the trunk group.
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 may be providing poor service. The five trunk groups with the highest percentage of blocking are listed in the list performance summary 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 load problems.
- A two-way trunk group with undesirable incoming blocking will not show any problems on this report, since only outgoing blocking is displayed 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.
- 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.
- For trunk groups with queues, the Queue Overflow field is incremented whenever a call finds the all trunks busy condition and the queue is full.
- For trunks groups without queues, the Calls Queued and Queue Overflow fields are always zero. The blocked call count is reflected in the Group Overflow field.
- If the Percent Outgoing Blocking field shows a value greater than zero, the Queue Overflow (if a queue is administered for the trunk group), Queue Abandon, and Group Overflow fields should also have values greater than zero.
- Measurement hour data reported in the System Status Report (for example, monitor 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 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 = 280

You can determine the Average Holding Time as follows:

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

$$Average\ Holding\ Time = \left[\frac{656\ CCS}{280}\right] \times \frac{100\ Seconds}{CCS}$$

$$Average\ Holding\ Time = 234\ seconds\ (or\ 3\ minutes\ \text{and}\ 54\ seconds)$$

Determining Trunk Group Blockage

Generally, you should use either the list measurements trunk-group summary 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)

$$Percent\ Out\ Blocking = \left[\frac{Group\ Overflow}{Total\ Seizures + Group\ Overflow}\right] \times 100\ \%$$

Two-Way Trunk Group

$$Percent\ Out\ Blocking\ =$$

$$\left[\frac{Group\ Overflow}{Total\ Seizures - Incoming\ Seizures + Group\ Overflow}\right] \times 100\ \%$$

NOTE:
If the trunk group has a queue, group overflow is calculated as follows:

$$Group\ Overflow = Queue\ Overflow + Queue\ Abandons$$

Example:

With the following data, determine the Percent Blocking of a two-way CO trunk group without a queue:

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

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

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

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 record 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 summary yesterday-peak**

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 peak hour (or, bouncing peak hour).
3. Trunk Group 1 is suspected of not providing the desired Grade of Service.

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

$$Total\ Calls\ Offered = Calls\ Carried + Group\ Overflow$$

For Trunk Groups With a Queue

$$Total\ Calls\ Offered =$$

$$Calls\ Carried + Queue\ Overflow + Queue\ Abandoned$$

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

$$Total\ Calls\ Offered = Calls\ Carried + Queue\ Overflow$$

$$Total\ Calls\ Offered = 280 + 50 + 1$$

$$Total\ Calls\ Offered = 331$$

The Average Holding Time is determined as follows:

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

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

$$Average\ Holding\ Time\ (in\ seconds) = 234.29\ seconds$$

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:

$$Offered\ Load = Average\ Holding\ Time\ (in\ seconds) \times Calls\ Offered$$

$$Offered\ Load\ (in\ CCS) = \frac{234.29\ (in\ seconds) \times 331\ calls}{100\ seconds\ per\ CCS}$$

$$Offered\ Load\ (in\ CCS) = 775.5$$

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 Tables*, 555-104-503, 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 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 775.5 CCS, the Retrial Capacity tables in the *DEFINITY Communications System and System 75 and System 85 Traffic Tables*, 555-104-503, indicate (under the column heading GROUP SIZE) that 32 trunks are required.

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

$$\#\ of\ In-Service\ Trunks = Trunk\ Group\ Size - Out\ of\ Service\ Trunks$$

$$\#\ of\ In-Service\ Trunks = 23 - 0$$

$$\#\ of\ In-Service\ Trunks = 23$$

Therefore, since 32 trunks are required but only 23 are currently in service, nine 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 peak hour (or, bouncing peak hour).
3. Data on 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:

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

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

$$Average\ Holding\ Time\ (in\ seconds) = 90.12\ seconds$$

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:

$$Offered\ Load\ =\ Average\ Holding\ Time\ (in\ seconds)\ \times\ Calls\ Offered$$

$$Offered\ Load\ (in\ CCS)\ =\ 90.12\ (in\ seconds)\ \times\ 86\ calls$$

$$Offered\ Load\ (in\ CCS)\ =\ 77.50\ CCS\quad or\quad 78\ CCS$$

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 System 85 Traffic Tables*, 555-104-503, 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 peak hour (or, bouncing peak hour).
3. 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 Tables, 555-104-503, 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

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 Usage 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 may be accommodated with the trunk group. It also specifies the minimum number of reserved channels and maximum number of channels that each service/feature may use at a given time.

3. The free pool concept is associated with UAP's. Specifically, free pool refers to the number of trunks that have not been reserved for a specific service/feature and are free to be assigned to another service or feature. The free pool is calculated as:

$$Free\ Pool\ =\ Total\ \#\ of\ in-service\ Trunks\ -\ \sum\ of\ the\ Mins*\ (for\ each\ S/F)$$

* Minimum channel assignment.

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 may be 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 CBC Trunk 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/DMI/ISDN-PRI Reference*, 555-025-101, for additional details.
6. For wideband calls that consume more than 64 kbps of bandwidth, the total usage consumed will be reflected in the Total Usage field. (For example, the usage for a 384-kbps call is six times more than for a 64-kbps call.) However, these calls will be counted only as a single call. The call counts that may be incremented due to wideband calls are: Total Seize, Incoming Seize, Overflow Trunk Group, Overflow Service/Feature, Overflow Maximum Service/Feature. The %ATB and %Out Blk fields are also affected by wideband calls.

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 Usage Allocation Plan (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). Note that if the trunk group is administered to support wideband switching, the tag "WIDEBAND Support" appears in the report title.

Command

To display the Trunk Group CBC Measurements Report, enter:

list measurements cbc-trunk-group <number> last-hour [print/schedule]

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

Screen

Screen 3-50 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 3-41 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            Date: 2:15 pm WED MAY 9, 1990
                 CBC TRUNK GROUP MEASUREMENTS (WIDEBAND Support)
                      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
 Service/     Min Max Meas Total Total Inc.  Tan  Ovf Ovf Ovf %    %  %Out
 Feature      Chn Chn Hour Usage Seize Seize Seize TG S/F Max TBM ATB BLK
 outwats-bnd    5  12 1300   240   333   0    55    0  0  23   10   2   1
 sdn            4   8 1300    40    30  22     1    0  0   0   62   1   0
 other          0  20 1300    70    41  36     3    0  0   0    0   0   0
Command successfully completed
Command:
```

Screen 3-50. Trunk Group Call-By-Call Measurements Report Screen

Table 3-41. 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. 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. **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 hour.
`Queue Overflow`	The total number of calls that were denied access to a trunk, found the queue full, and the caller received reorder tone. **Suggested Actions:** Generally, this field will indicate the number 0. If this field indicates a high number, then: 1. The queue size may be too small, or 2. More trunks may be needed so that fewer calls will queue, or 3. The UAP may be too restrictive (for example, some of the “Min Chn” values may be to high, or some of the “Max Chn” values may be too low). Also, see Suggested Actions in the % TBM description.

Table 3-41. Trunk Group Call-By-Call Measurements Report

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). **Suggested Action:** 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 long time. Consider adding more trunks so that fewer calls will queue.
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 may be 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. **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 durations (in minutes) that each plan was in effect during the measurement interval. The Number field can display up to a maximum of six plan numbers. 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.
Usage Allocation Plan Used (Contd)	Each CBC trunk group is administered with either “fixed” allocation or “scheduled” 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.

Table 3-41. Trunk Group Call-By-Call Measurements Report

Field	Description
`Service/Feature`	The names of up to ten services/features and the special identifier "other" for which the associated measurements are being reported. The following services/features can be administered in a UAP: ACCUNET. digital service i800 inwats lds MEGACOM telecommunications service MEGACOM 800 telecommunications service MULTIQUEST. telecommunications service operator other outwats-bnd public-ntwrk sdn sub-operator wats-max-bnd 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. If public network access is to an LEC or to an IXC other than AT&T, then that carrier's ISDN services/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.
`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.
`Total Seize`	*Total Seizures.* The total number of incoming and outgoing calls that requested the specified service/feature through the ISDN-PRI CBC trunk group.
`Inc. Seize`	*Incoming Seizures*. The total number of incoming calls that requested the specified service/feature through the ISDN-PRI CBC trunk group. For two-way and outgoing trunks, the number of *Outgoing Seizures* can be calculated as follows: $$Out\ Seize = Total\ Seize - In\ Seize$$
`Tan Seize`	*Tandem Seizures*. The total number of trunk-to-trunk call seizures using this Service/Feature.

Table 3-41. Trunk Group Call-By-Call Measurements Report

Field	Description
`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. **NOTE:** 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). If more than one of the overflow conditions is met, only the field that represents the condition with the highest priority is incremented.
`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: ■ The specified service/feature was at or above its minimum channel allocation and below its maximum allocation. ■ There were idle channels available in the trunk group, but they had been reserved to meet the minimum channel allocation for other services/features. `Suggested Actions:` 1. Investigate the possibility of raising the “Min Chn” requirements for this service/feature. 2. Investigate the possibility of increasing the number of members for the trunk group. 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.

Table 3-41. Trunk Group Call-By-Call Measurements Report

Field	Description
`Ovf Max`	*Overflow maximum.* The number of calls that were not carried because 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. **Suggested Actions:** 1. Investigate the possibility of raising the number that is administered in the Max Chn field. This is only possible provided that the free pool is not exceeded. To determine whether or not you have more trunks available for a S/F calculate the following: $Max - Min\ (for\ the\ identified\ S/F) \leq Free\ Pool$ For example, use the above equations with the data in the formula as follows: $Free\ Pool = Total\ \#\ of\ in-service\ trunks - \sum Min \text{ for } each\ S/F$ $Free\ Pool = 18 - (5+4)$ $Free\ Pool = 9$ $8 - 4\ (for\ SDN) \leq 9$ $4 \leq 9\quad Therefore,\ you\ can\ increase\ the\ Max$ 2. Consider adding more trunks to the trunk group and increase the maximum for the identified service/feature.
`% 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. **Suggested Action:** Lower the “Min Chn” since this may be the cause for the “Ovf S/F”. **NOTE:** If the field (% TBM” is high, then you are reserving 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.

Table 3-41. Trunk Group Call-By-Call Measurements Report

Field	Description
`% 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: ■ All trunks in the ISDN-PRI CBC trunk group were busy on a call or busied-out by maintenance. ■ This service/feature was above its minimum; and all available trunks were reserved for other features/services that were below their minimums. ■ The specified feature or service was at its maximum number of channels.
`% ATB (Contd)`	1. A number in the Ovf TG field indicates that the physical maximum number of trunks has been exhausted. Unless the trunk group is the last preference in the routing pattern, overflow is to the next trunk group. Otherwise, the obvious choice is to add more trunks to the trunk group. 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. 3. If the Ovf Max field indicates a problem (a significant number), refer to **Suggested Actions** in the Ovf Max description. **NOTE:** If the ISDN-PRI CBC trunk group has been administered to support wideband switching, the title WIDEBAND Support will appear in the report title.

Table 3-41. Trunk Group Call-By-Call Measurements Report

Field	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 queue abandons plus those calls that find all facilities for the specified service/feature busy and cannot be queued because the queue is full. **Suggested Actions:** 1. Look at the % ATB column and identify any service/feature that has a high value. Follow the **Suggested Actions** in the % ATB description. 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. 3. If conditions are such that Item 1 above is not appropriate, then you may find it necessary to add more trunks.

Trunk Lightly Used Measurements Report

The Trunk Lightly Used Measurements Report lists the five trunk members with the lowest number of calls carried for each trunk group. The trunk lightly used data is kept for the current day, the previous day, and the last hour.

Command

To display the Trunk Lightly Used Measurements Report, enter:

list measurements lightly-used-trunk [option] [print/schedule]

Options: Options are **yesterday** for a report of yesterday's trunk activity, **today** for a report of today's trunk activity, or **last-hour** for a report of the trunk activity of the most recently completed hour.

Screen

Screen 3-51 shows a typical screen for the Trunk Lightly Used Measurements Report. The time and date that the report was requested is displayed at the top right. Table 3-41 lists and describes the data fields in the Trunk Lightly Used Measurements Report.

```
list measurements lightly-used-trunk yesterday
 Switch: Cust_Switch_Name                     Date:  4:03 pm SAT MAY 19, 1990
                          TRUNK LIGHTLY USED REPORT
 (five trunks with lowest number of calls carried  W = Wideband Support)
 Grp     Grp    Grp    Grp    Grp    Calls
 No.     Type   Dir    Size   Mbr#   Carried
 1       co     two    5      3      0
 1       co     two    5      4      3
 2       isdn   two    5      3      7          W
 2       isdn   two    5      4      8          W
 2       isdn   two    5      5      10         W
 4       wats   out    10     2      6
 4       wats   out    10     6      6
 4       wats   out    10     9      7
 4       wats   out    10     4      12
 4       wats   out    10     10     13
Command successfully completed
Command:
```

Screen 3-51. Trunks Lightly Used Report

Table 3-42. Trunk Lightly Used Measurements Report

Field	Description
`Grp No.`	*Group Number.* A number that identifies the trunk group associated with the displayed data.
`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 3 V4 Feature Description*, 555-230-204): ■ Access (`acc`) ■ Advanced Private Line Termination (`aplt`) ■ Central Office (`co`) or Public Network Service ■ Customer Provided Equipment (`cpe`) ■ Direct Inward Dialing (`did`) ■ Direct Inward/Outward Dialing (`diod`) ■ Foreign Exchange (`fx`) ■ Integrated Services Digital Network (`isdn-pri`) ■ Release Link Trunk (`rlt`) ■ Tandem (`tan`) ■ Tie Trunk (`tie`) ■ Wide Area Telecommunications Service (`wats`)
`Grp Dir`	*Group Direction.* Identifies whether the trunk group is incoming (`inc`), outgoing (`out`), or two-way (`two`).
`Grp Size`	*Group Size.* The number of administered trunks in a specified trunk group. Refer to the *DEFINITY Communications System Generic 3 V4 System Description and Specifications*, 555-230-206, for additional details.

Table 3-42. Trunk Lightly Used Measurements Report

Field	Description
`Grp Mbr #`	*Group Member Number.* The number that identifies a specific trunk member (in the group number).
`Calls Carried`	The number of calls carried on the trunk member over the report interval (yesterday, today, or last hour). Wideband calls increment this counter once for every trunk or 64-kbps channel that they use. **Suggested Action:** 1. If the identified trunk member has zero or a very small number of calls (seizures) in comparison to other listed trunk members, then you should use the Facility Test Calls feature to determine whether a specific trunk member is functioning. 2. If a trunk is just suspected of causing problems, you should use the ACA feature to monitor the particular trunk group.
`Wideband Flag`	If any trunks in the trunk group were used in a wideband (n X DS0) connection, a “W” appears next to the trunk entry. In addition, the tag “W = Wideband Support” appears in the report heading.

Wideband Trunk Groups

This section describes the traffic reports and selection screen for wideband trunk groups. It also provides guidelines for validating and analyzing the wideband trunk group data.

Wideband Trunk Group Summary Report

The Wideband Trunk Group Summary Report gives traffic measurements for all trunk groups administered to support wideband switching. By using this report, you can determine the trunk group total wideband usage (in CCS), the total number of wideband calls, the percentage of wideband calls that were blocked, and other measurement data.

Command

To display the Wideband Trunk Group Summary report, enter:

list measurements wideband-trunk-group summary [option] [print/schedule]

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

Screen

Screen 3-52 shows a typical screen for the Wideband Trunk Group Summary Report. Table 3-43 describes the data fields presented in the Wideband Trunk Group Summary Report.

```
list measurements wideband-trunk-group summary last-hour
 Switch Name: Cust_Switch_Name                   Date: 1:58 pm MON SEP 16, 1991
                        WIDEBAND TRUNK GROUP SUMMARY REPORT
             Peak Hour For Wideband Usage For All Trunk Groups: 1000
 Grp Grp  Grp Service Meas Total Total Inc.  Grp  Out   %  %Out
 No. Size Dir Type    Hour Usage Seize Seize Ovfl Serv ATB Blk
 37  22   two access  1200 598   5     0     0    0    0   0
 38  23   two cbc     1200 171   2     0     0    0    0   0
 39  22   two sdn     1200 270   3     0     0    0    0   0
```

Screen 3-52. Wideband Trunk Summary Report Screen

Table 3-43. Wideband Trunk Group Summary Report

Field	Description
`Peak Hour for Wideband Usage for All Trunk Groups`	The hour during the specified day that has the highest total wideband call usage, when summed over all trunk groups. 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 time-consistent 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 may or may not occur during the time-consistent busy hour. These traffic reports and accompanying trunk group data worksheet only use the bouncing peak hour method. Note that if the total usage for the current hour equals the total usage for the previous peak hour, then the peak hour is the hour with the greatest number of total seizures.
`Grp No.`	*Group Number*. A number that identifies each trunk group associated with the displayed data. 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.
`Grp Dir`	*Trunk Group Direction*. Identifies whether the trunk group is incoming (`inc`), outgoing (`out`), or two-way (`two`).
`Service Type`	*Service Type*. The administered Service Type for the trunk group. Valid entries are `accunet`, `i800`, `inwats`, `lds`, `mega800`, `megacom`, `multiquest`, `operator`, `other`, `outwats-bnd`, `public-ntwrk`, `sdn`, `sub-operator`, and `wats-max-bnd`.

Table 3-43. Wideband Trunk Group Summary Report

Field	Description
`Meas Hour`	*Measurement Hour*. The hour (using 24-hour clock) 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 could be different).
`Total Seize*`	*Total Seizures*. The number of wideband call attempts. This measurement includes completed calls, false starts, don't answers, and busies.
`Inc. Seize*`	*Incoming Seizures*. The number of wideband incoming call attempts. This measurement includes completed calls, false starts, don't answers, and busies. The number of Outgoing Seizures can be calculated as follows: $$Out\ Seize = Total\ Seize - Inc\ Seize$$
`Total Usage`	Total wideband call usage (in CCS) for all trunks in the trunk group. Represents the total time the trunks are busy processing wideband calls.
`Grp Ovfl`	*Group Overflow*. The number of outgoing wideband calls that were attempted when the remaining trunk group capacity was insufficient to accommodate the call or the trunk group's remaining bandwidth was in the wrong configuration. This measurement does not include unauthorized calls that are denied service on the trunk group (due to restrictions). * The number of wideband calls equals the number of actual calls, regardless of the number of trunks involved in the call.

Table 3-43. Wideband Trunk Group Summary Report

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 the data is collected. **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. 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. **NOTE:** In use means that the trunks were busy—either serving calls, or because they were busied-out by maintenance. **Suggested Actions:** 1. If the group direction is outgoing or two-way, then a high number in the `% ATB` field and nothing in the `Grp Ovfl` would indicate that everything is functioning normally. 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. Unless this trunk group is the last preference in the pattern, overflow is to the next 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. 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.

Table 3-43. Wideband Trunk Group Summary Report

Field	Description
`% Out Blk`	*Percentage Outgoing Blocking*. The percentage of offered wideband calls that are not carried on the trunk group. It does not include unauthorized wideband 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). The calls not carried are calls that are made when the remaining trunk group capacity is insufficient to serve them. The Percentage Outgoing Blocking is calculated as follows: The number of Outgoing Seizures is calculated as follows: Outgoing Seizures = Total Seizures - Incoming Seizures Similarly, the equation for calculating Outgoing Calls Offered is as follows: $Outgoing\ Calls\ Offered = Group\ Overflow + Outgoing\ Seizures$ $\%\ OutBlk = \left[\frac{Group\ Overflow}{Outgoing\ Calls\ Offered}\right] \times 100$

Wideband Trunk Group Hourly Report

For the trunk groups chosen at the Wideband Trunk Group Selection screen, the Wideband Trunk Group Hourly Report lists the wideband call activity for all hours of switch activity. This information helps you validate the information in the Wideband Trunk Group Summary Report.

Command

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

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

Screen

Screen 3-53 shows a typical screen for the Wideband Trunk Group Hourly Report. Table 3-44 and Table 3-45 describe the data fields presented in the Wideband Trunk Group Hourly Report. The report contains two sections: a header section that provides the report ending time and trunk group administrative information; and a data section that provides the measurement data for 24 hours.

```
list measurements wideband-trunk-group hourly 40
Switch Name: Cust_Switch_Name                 Date: 1:58 pm MON SEP 16, 1991
                       WIDEBAND TRUNK GROUP HOURLY REPORT
 Grp No: 40      Grp Size: 23    Grp Dir: two  Service Type: access
 Meas  Total  Maint  Total   Inc.   Tandem  Grp    Out   %  %Out
 Hour  Usage  Usage  Seize   Seize  Seize   Ovfl   Serv ATB Blk
 1200  262    0      3       0      0       6      0    6   15
 1100  312    0      3       0      0       0      0    0   0
 1000  169    0      1       0      0       4      0    3   5
 900   26     0      0       0      0       0      0    0   0
 800   1      1      4       0      0       0      0    0   0
```

Screen 3-53. Wideband Trunk Group Hourly Report Screen

Table 3-44. Wideband Trunk Group Hourly Report (Header)

Field	Description
`Grp No:`	*Group Number*. A number that identifies the trunk group associated with the displayed data.
`Grp Size:`	*Group Size*. Number of trunks in the trunk group.
`Grp Dir:`	*Group Direction*. Incoming (`inc`), outgoing (`out`), or two-way (`two`).
`Service Type:`	*Service Type*. The administered Service Type for the trunk group. Valid entries are `accunet, i800, inwats, lds, mega800, megacom, multiquest, operator, other, outwats-bnd, public-ntwrk, sdn, sub-operator, and wats-max-bnd.`

Table 3-45. Wideband Trunk Group Hourly Report (Data)

Field	Description
`Total Usage`	Total wideband call usage (in CCS) for all trunks in the trunk group. Represents the total time the trunks are busy processing wideband calls.
`Maint Usage`	*Maintenance 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*`	*Total Seizures*. The number of wideband call attempts. This measurement includes completed calls, false starts, don’t answers, and busies.

Table 3-45. Wideband Trunk Group Hourly Report (Data)

Field	Description
`Inc. Seize*`	*Incoming Seizures*. The number of wideband incoming call attempts. This measurement includes completed calls, false starts, don't answers, and busies. The number of Outgoing Seizures can be calculated as follows: $Out\ Seize = Total\ Seize - Inc\ Seize$ $Outgoing\ Calls\ Offered = Group\ Overflow + Outgoing\ Seizures$ $\%\ OutBlk = \left[\frac{Group\ Overflow}{Outgoing\ Calls\ Offered}\right] \times 100$
`Tandem Seize*`	*Tandem Seizures.* The number of trunk-to-trunk wideband call seizures. This count is incremented on the outgoing-trunk side of the connection.
`Grp Ovfl`	*Group Overflow.* The number of outgoing wideband calls that were attempted when the remaining trunk group capacity was insufficient to accommodate the call or the trunk group's remaining bandwidth was in the wrong configuration. This measurement does not include unauthorized calls that are denied service on the trunk group (due to restrictions).
`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 measurement interval that all trunks in the group are unavailable to carry a new call (All Trunks Busy).
`%Out Blk`	*Percent Outgoing Blocking.* The percent of the outgoing wideband call seizures, including tandem wideband call seizures, offered to that trunk group that are not carried on that trunk group. The value is calculated as follows: *% Out Blk = {Grp Ovfl / [Total Seize - Inc Seize + Grp Ovfl]} x 100*

* The number of logical calls equals the number of actual calls, regardless of the bandwidth.

Wideband Trunk Group Measurement Selection Form

The Wideband Trunk Group Measurement Selection Form is used at administration time to specify trunk groups to list on the Wideband Trunk Group Hourly Reports. It permits the user to administer which trunk groups are to be reported for the hourly report. (Measurements on administered trunk groups are collected to list them on the wideband summary and hourly reports.) A maximum of 10 trunks can be studied on the G3i and G3s. On the G3r, the maximum is 30. If no selections are made, no trunk groups will be studied hourly.

Command

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

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

Options: The print and schedule options are available for the display command only.

Screen

Screen 3-54 shows a typical screen for the Wideband Trunk Group Measurement Selection Form on the G3r. Table 3-46 describes the data fields presented in the Wideband Trunk Group Measurement Selection Form.

```
display meas-selection wideband-trunk-group
WIDEBAND TRUNK GROUP MEASUREMENT SELECTION
 Trunk Group Numbers
1:   78          7:  15        13:    96         19:  333         25:  580
2:   80          8:  16        14:    97         20:  444         26:  590
3:  666          9:  17        15:    98         21:  555         27:  591
4:    1         10:  18        16:   100         22:  101         28:  592
5:    2         11:  81        17:   120         23:  102         29:  10
6:    3         12:  82        18:   200         24:  103         30:  99
```

Screen 3-54. Wideband Trunk Group Measurement Selection Screen

Table 3-46. Wideband Trunk Group Measurement Selection Form

Field	Description
`Trunk Group Numbers`	Defines the trunk group(s) to be studied hourly for wideband activity.

Data Analysis Guidelines

The wideband summary and hourly reports closely parallel the other trunk group summary and hourly reports. That is, visually they contain similar fields, except there is no queuing for wideband calls, so queuing fields are eliminated. Logically, the difference is that only the wideband reports isolate wideband call usage. If the trunk group processes ordinary narrowband calls during the measurement period, the narrowband measurements are NOT included in the wideband traffic measurements.

With the overall trunk group measurements and the wideband trunk group measurements, the customer has data for all usage and can calculate the narrowband call usage and counts by subtracting the wideband measurement from the overall measurements.

Wideband Trunk Group Summary Report

The Wideband Trunk Group Summary Report provides data essential for monitoring trunk groups supporting wideband service to assure that they are providing the expected level of service. The report is modeled after the Trunk Group Summary Report but only trunk groups administered to provide wideband service are reported. Other trunk groups do not appear on the report. If a trunk group is administered to provide wideband service but had no wideband traffic during the measurement period, then zeros are shown on the report.

The yesterday-peak and today-peak reports list the wideband call activity for the peak wideband traffic hour. That is, the measurements shown are those that occurred during the hour in which the Total Usage for wideband service for that trunk group was highest. This is not necessarily the same peak hour as the peak hour for total usage as shown on the overall Trunk Group Summary Report. Note that on the Wideband Trunk Group Summary Report, the measurements for different trunk groups will not necessarily be time-coincident with each other.

CAUTION:
The yesterday-peak and today-peak reports cannot be used to determine narrowband usage except in cases where the peak traffic hour for total

usage (shown on the overall report) is the same as the peak hour for wideband usage (shown on this report) for a particular trunk group in the same measurement period. In this case alone, narrowband measurements for that trunk group may be determined by subtracting the wideband measurements from the measurements shown on the overall report for the same trunk group.

CAUTION:
For trunk groups where the peak hour is different on the overall summary report from that shown on the wideband summary report, the narrowband usage must be determined by using the measurements on the Wideband

CAUTION:
Trunk Group Hourly Report. In addition, if there were calls blocked at that time, the group should be studied using both the overall and wideband hourly reports to determine whether wideband calls were blocked.

Wideband Trunk Group Hourly Report

The Wideband Trunk Group Hourly Report shows the wideband call activity for each hour in the current 24-hour period. A separate report is generated for each measured wideband trunk group.

For trunk groups having mixed wideband and narrowband traffic, it is best to administer the trunk group to appear on both the overall and wideband hourly trunk group reports. In this way a complete picture of usage and blockages is possible. For these trunk groups, direct comparisons can be made between measurements for the same hour on the overall and wideband reports. For example, if the hour beginning at 1:00 p.m. is examined for the same trunk group on both the overall hourly report and on the wideband hourly report, the narrowband usage measurements may be determined by subtracting the wideband data from the overall data. This can be done for each hour in the 24-hour period.

Note that some measurements, such as trunks-out-service and all-trunks-busy, will be identical for the same hour on the wideband and overall reports for the same trunk group.

Performance Considerations

Although version 2 of the various G3 switches support wideband transmission for from 2 to 30 channels, the most common transmissions are at the H channel rates:

H Rate	Speed	# 64-Kbps Channels
H0	384 Kbps	6
H11	1.536 Mbps	24
H12	1.920 Mbps	30

When considering how many trunks to put in a trunk group that supports wideband call activity, remember that:

- Every wideband call must be carried on a single DS1 interface. That is, when the bandwidth on one interface is insufficient for the call, another interface must be found that can accommodate the entire call. The bandwidth for the call *cannot* be spread over 2 or more interfaces. The chances for finding enough bandwidth on a single interface are far less than finding the bandwidth on several interfaces.
- Some far end switches (for example, the 4ESS) require that the bandwidth for a call be contiguous. That is, not only must the call be carried over a single interface, but the channels over which the call is carried must be consecutively numbered. The chances for finding contiguous bandwidth are far less than for finding the bandwidth on a single interface alone.

To increase the chances of providing the bandwidth that a wideband call requires, either put as many trunks as possible in the trunk groups you have designated for wideband call usage or put as many trunk groups as possible in the wideband routing pattern.

Processor Occupancy Reports

4

Processor Occupancy 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 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** (G3r only)
- **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 if allowed to. However, for most systems, the two primary users will be (1) the customers' telecommunications manager, and (2) the service technician.

The type of application can significantly affect processor occupancy. 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 load that consists of any combination of the three defined applications.

Depending on the customers' specific application, the calling traffic may be 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
- Determine 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

Screen 4-1 and Screen 4-2 show typical output for the Processor Occupancy Summary Report. The time and date that the report was requested are displayed at the top right of the screen.

Table 4-1 describes the data fields presented in the Processor Occupancy Summary Report.

```
list measurements occupancy summary                                Page 1
Switch Name: Cust_Switch_Name             Date: 11:33 am  TUE JUL 31, 1990
      OCCUPANCY SUMMARY MEASUREMENTS
      Peak Hour For Occupancy: 0900
Meas Static CP   Sm  Idle Total Tandem Total Intcom  Inc    Out    Pnet
Hour Occ    Occ  Occ Occ  Calls Calls  Atmpts Atmpts Atmpts Atmpts Atmpts
1900 5      58   15   22  761   149    989    247    193    251    298
1800 5      58   16   21  1032  165    1341   335    371    301    334
1700 5      57   16   22  1442  273    1875   468    451    421    535
1600 5      58   15   22  2301  365    2991   747    710    753    781
1500 5      57   15   22  2769  476    3509   877    932    748    952
1400 5      58   15   22  2959  483    3846   961    991    928    966
1300 5      57   15   23  2997  499    3896   974    1021   900    1001
1200 5      59   15   21  4221  923    5487   1371   1520   745    1851
1100 5      59   15   21  5001  826    6501   1625   2000   1223   1653
1000 4      59   13   24  5241  915    6813   1703   2066   1165   1879
       press CANCEL to quit -- Press NEXT PAGE to continue
```

Screen 4-1. Summary Last Hour/Busiest Interval Report

```
list measurements occupancy summary                                Page 2
Switch Name: Cust_Switch_Name             Date: 11:33 am  TUE JUL 31, 1990
      OCCUPANCY SUMMARY MEASUREMENTS
      Peak Hour For Occupancy: 0900
Meas Static CP   Sm  Idle Total Tandem Total  Intcom Inc    Out    Pnet
Hour Occ    Occ  Occ Occ  Calls Calls  Atmpts Atmpts Atmpts Atmpts Atmpts
0900 5      65   12   18  5392  1002   7011   1752   2045   1203   2011
0800 5      64   14   17  5364  941    6973   1743   2056   1283   1891
0700 5      58   15   22  5423  935    7049   1762   2070   1346   1871
0600 6      60   17   17  4399  761    5719   1430   2195   569    1525
Command successfully completed
Command:
```

Screen 4-2. 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 listed beginning with the most recently completed hour in the preceding 24-hour interval. Refer to the *DEFINITY. Communications System Generic 3 — System Description and Specifications*, 555-230-206, for additional details.
`Meas Min`	*Measured Minute.* (Last-Hour Sub-Report) The end-time of the 3-minute interval for which the measurement is taken. It takes the form hh:mm, where “hh” is the hour and “mm” is the end-time for the 3-minute interval.
`Date of Occur`	*Date of Occurrence.* (Busiest-Interval Sub-Report) The date and end-time of the 3-minute interval for which the data was collected. It takes the form MM/dd/mm:hh, where “MM” is the month, “dd” is the day, “hh” is the hour and “mm” is end of the 3-minute interval.
`Stat Occ`	*Static Occupancy.* The amount of time (in CCS) 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. **NOTE:** Static Occupancy remains fairly consistent in an idle switch. However, it increases as traffic is introduced into the system.

Table 4-1. Processor Occupancy Summary Report

Field	Description
`CP Occ`	*Call Processing Occupancy.* The amount of time (in CCS) taken by call processing level processes. The processing of CDR, 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. **NOTE:** 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. **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: Item #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. Item #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. Item #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 sets do not have a display module. Item #4 Check the hardware error log for high levels of maintenance activity.

Table 4-1. Processor Occupancy Summary Report

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 Generic 3 System Description and Specifications*, 555-230-206, 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 because 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 percent for a sustained period.**
`Total Calls`	*Total Calls.* The total number of calls connected 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.
`Tandem Calls`	*Tandem Calls.* The number of trunk-to-trunk calls connected during the last hour.

Table 4-1. Processor Occupancy Summary Report

Field	Description
`Total Atmpts`	*Total Attempts.* The number of call attempts made during the measurement interval. The following occurrences count as an attempt: ■ A user lifts the station handset and hangs up before dialing any digits (off-hooks) ■ 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) ■ A user lifts the station handset, dials the destination number, the far end is busy ■ A user places a call that is answered by the dialed number ■ A user conferences a second party onto the call ■ An incoming trunk seizure ■ Maintenance requests that an outgoing trunk be seized ■ Tandem calls (either pnet or public network) result in 2 attempts, but only one total call ■ AUDIX audits of message waiting lamps ■ AUDIX Leave Word Calling activations **NOTE:** Mathematically, the `Total Atmpts` field is the total of the Intcom, Inc, Out, and Pnet attempts.
`Intcom Atmpts`	*Intercom 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.

Table 4-1. Processor Occupancy Summary Report

Field	Description
`Inc Atmpts`	*Incoming Attempts.* The number of incoming trunk seizures from public network facilities.
`Out Atmpts`	*Outgoing Attempts.* The number of outgoing trunk seizures that are made over public network facilities.
`Pnet Atmpts`	*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. **NOTE:** 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

Screen 4-3 shows 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.

```
list measurements occupancy last-hour                              Page 1
Switch Name: Customer_Switch_name          Date:  3:13 pm  MON NOV 11, 1991
      OCCUPANCY LAST-HOUR MEASUREMENTS
Meas    Static CP   Sm   Idle Total  Tandem Total  Intcom Inc    Out    Pnet
Minutes  Occ   Occ  Occ   Occ  Calls  Calls  Atmpts Atmpts Atmpts Atmpts Atmpt
15:11     2     5   26    67    646   710     1421      0      0      0    1421
15:08     4     5   22    69    641   704     1412      0      0      0    1412
15:05     5     6   25    64    639   705     1410      0      0      0    1410
15:02     4     6   24    66    645   710     1420      0      0      0    1420
14:59     3     4   22    71    639   703     1411      2      0      0    1409
14:56     3     5   24    68    639   704     1412      2      0      0    1410
14:53     6     6   24    64    645   704     1418      3      0      0    1415
14:50     4     5   27    64    641   707     1418      3      0      0    1415
14:47     4     6   19    71    648   706     1429      3      0      0    1426
14:44     2     5   26    67    639   701     1405      3      0      0    1402
14:41     4    14   19    63   1624  1075     2399    243      0      0    2156
14:38     6    15   28    51   1786  1133     2556    290      0      0    2266
Command successfully completed
Command
```

Screen 4-3. Processor Occupancy Last-Hour Measurements Report Screen

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 Minutes` 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 load 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 Atmpts` 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 call processing stimuli that do not result in completed calls.

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.

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-intervals [print/schedule]

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

Screen

Screen 4-4 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`

`Occurrence` 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.

```
list measurements occupancy busiest-intervals                        Page 1
Switch Name:  Customer_Switch_Name         Date:  3:13 pm  MON NOV 11, 1991
    OCCUPANCY BUSIEST 3-MINUTE INTERVALS MEASUREMENTS
Date of      Static CP    Sm  Idle Total Tandem Total  Intcom Inc    Out    Pnet
Occurrence   Occ    Occ   Occ Occ  Calls Calls  Atmpts Atmpts Atmpts Atmpts Atmpts
11/11/10:20 16       9    26  49    686  490    1225   245     0      0      980
11/11/11:14  8      16    27  49   1788  1130   2558   286     0      0     2272
11/11/12:38  7      15    21  57   1786  1131   2554   286     0      0     2268
11/11/13:41  6      16    26  52   1786  1129   2553   290     0      0     2263
11/11/14:11  7      15    25  53   1780  1135   2557   285     0      0     2272
Command successfully completed
Command:
```

Screen 4-4. 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 load 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 Atmpts` 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. This command is available on the G3r switch.

When to Use the Pktint Command

Use the Pktint command to provide a 24-hour history of the occupancy 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

Screen 4-5 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.

```
list measurements occupancy pktint
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
```

Screen 4-5. Processor Occupancy Pktint Sub-Report Screen

Table 4-2. Processor Occupancy Pktint Sub-Report

Field	Description
Meas Hour	*Measurement Hour.* The starting hour in which the measurements are taken.
PKT-INTN Occ	N is 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 0 with the note **BRDNINST** indicating that the board was not inserted. If the board is out of service this field will display a 0 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 0 with the note **DA_N_AVAIL** indicating that the data cannot be retrieved. **Suggested Action:** The occupancy should generally run about two percent. At occupancy nears 100%, you should consider adding another PKTINT.

The Communications Links Command

This section describes the Processor Occupancy Communications Links command.

When to Use the Communications Links Command

The main function of the communications links command is to:

- Obtain a report that facilitates the monitoring of traffic over the processor interface links
- Determine if it is necessary to perform load balancing
- Identify defective processor interface links

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 xx-yy [print/schedule]

Substitute either “1-8” or “9-16” for “xx-yy” on the command line.

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

Screen

Screen 4-6 and Screen 4-7 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 Screen 4-6 and Screen 4-7.

```
list measurements communications-links 1-8                          Page 1
Switch Name: Cust_Switch_Name               Date:  1:55 pm  TUE JUL 31, 1990
    COMMUNICATION LINK MEASUREMENTS
Meas     Link     Link     Link     Link     Link     Link     Link     Link
Hour     1        2        3        4        5        6        7        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
```

Screen 4-6. Processor Occupancy Communication Measurement Report Screen — Page 1

```
list measurements communications-links 1-8                          Page 2
Switch Name: Cust_Switch_Name               Date:  1:55 pm  TUE JUL 31, 1990
    COMMUNICATION LINK MEASUREMENTS
Meas     Link     Link     Link     Link     Link     Link     Link     Link
Hour     1        2        3        4        5        6        7        8
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
Command:
```

Screen 4-7. Processor Occupancy Communication Measurement Report Screen — Page 2

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 2 [on 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 1 through 8 or 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

Screen 4-8 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 manual*, 555-230-651.

```
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
```

Screen 4-8. Processor 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 hourly 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**`).

During a partial system reset (for example, 1 or 2, Cold 1, or Cold 2) the measurement data is retained for the affected time interval. However, during a full system reset (for example, 3, 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 recording four weeks of data, you should calculate the column averages and record the averages in the appropriate 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 record 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, "Blank Worksheets" 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 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.

$$\%\ INTCOM = \frac{Int\ Atmpt}{Total\ Atmpt} \times 100$$

$$\%\ INC = \frac{Inc\ Atmpt}{Total\ Atmpt} \times 100$$

$$\%\ OUT = \frac{Out\ Atmpt}{Total\ Atmpt} \times 100$$

$$\%\ PNET = \frac{Pnet\ Atmpt - Tandem\ Calls}{Total\ Atmpt} \times 100$$

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 Design Center. For more information contact your Account Team.

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 refer to the configuration guidelines for the switch.

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.

$$Calls\ Predicted = \frac{Static\ Occ + CP\ Occ}{70} \times BHCC$$

NOTE:
1) The divisor number, 70, is the constant from Step 1 and refers to the percentage of the processor used by call processing.

NOTE:
2) The number for BHCC is the number that is obtained from Step 4.

b. Second, compare the Calls Predicted number to the four-Week average Total Calls field on Worksheet 5.

$$Calls\ Predicted < Total\ Calls$$

or

$$Calls\ Predicted > Total\ Calls$$

c. 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.

NOTE:
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.

$$Number\ of\ Additional\ Calls\ =$$

$$\frac{Total\ Calls\ (4\ Week\ Avg)}{Static\ Occ\ +\ CP\ Occ} \times (Idle\ Occ\ -\ 15)$$

Step 7. Determine how many additional extensions can be added.

$$Additional\ Extensions\ =\ \frac{Number\ of\ Additional\ Calls}{Average\ Number\ of\ Calls\ per\ Extension}$$

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).

Security Violations Reports

5

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 invalid 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 barrier codes; that is, about 3.75 invalid barrier codes are submitted per hour. With this information in hand, you may administer 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 Security Form.)

Information about invalid login attempts and invalid remote access barrier codes 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 all aspects 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 identifies the 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 on site maintenance.

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

Screen 5-1 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 5-1 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
```

Screen 5-1. Security Violations Summary Sub-Report Screen

Table 5-1. 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.
`Valid`	The total number of times a user entered a valid remote access barrier code. Barrier codes are used with remote access trunks. An inexplicable, significant increase in valid barrier code use could indicate that the barrier code has been compromised.
`Invalid`	The total number of times a user entered an invalid remote access barrier code. Barrier codes are used with remote access trunks. A marked increase in this number may indicate someone is *attempting* to break into your system. If you have just administered a new barrier code, or a barrier code expired recently, it may indicate people are making honest mistakes. **Suggested Action:** Delete or 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 entered. A remote access barrier code security violation occurs when the number of invalid barrier code attempts exceeds the threshold and time interval parameters administered for the remote access component of the SVN (security violation notification) feature. You can define the meaning of a barrier code security violation by setting two parameters administratively: 1. The number of invalid barrier codes submitted 2. The time interval 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.

Table 5-1. Security Violations Summary Sub-Report

Field	Description
`Authorization Code Originator`	The type of resource originating the calls that generated the valid/invalid authorization codes measured. Originators may be: ■ Station ■ Trunk (other than remote access) ■ Remote Access ■ Attendant ■ Total (of all types above)
`Valid`	The total number of valid authorization codes originating from the designated originator type. **Suggested Action:** If valid authorization code usage increases dramatically, you should investigate. 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. **Suggested Action:** If invalid authorization code usage increases dramatically, you should investigate. 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.

Table 5-1. Security Violations Summary Sub-Report

Field	Description
`System Management Login Measurements Port Type`	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. On the G3r, port types can be: ■ *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. ■ *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. ■ *MAINT:* These ports on the Expansion Port Networks maintenance boards are typically used as local connections for on site 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. ■ *SYS-PORT (System Ports):* These ports are accessed by dial-up through the TDM bus.
	On the G3i and G3s, port types can be: ■ *MGR1*: The dedicated system administration terminal connection. ■ *NET*: The network controller dial-up ports. ■ *EPN*: The EPN maintenance EIA port. ■ *INADS*: The Initialization and Administration System port.
`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.

Table 5-1. Security Violations Summary Sub-Report

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. **NOTE:** Look for numbers that are significantly higher than normal. 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.
`Login Forced Disconnects`	The total number of login processes that were disconnected automatically by the switch because the threshold for consecutive 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.
	As with barrier code attempts, the user can define the meaning of a security violation by setting two parameters administratively: 1. The number of unsuccessful logins 2. The time interval
	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.

NOTE:
G3V3 provides you with the ability to administer logins. The implication of this functionality is that you may add logins but they will not be included in the Security Violations Detail Sub-Report until the next hourly update or until you enter the “clear measurements security violations” command. Similarly, you may remove logins but they will be included in the Security Violations Detail Sub-Report until the next hourly update or until you enter the “clear measurements security violations” command. “Clear measurements security violations” is a feature administration category command.

Screen

Screens 5-2 to 5-5 are typical screens for the Security Violations Detail Sub-Report on all G3r. Table 5-2 describes those data fields presented in the Security Violations Detail Sub-Report that are unique to it. The others will be found in Table 5-1.

```
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
```

Screen 5-2. Security Violations Detail Report Screen — Page 1

```
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
craft     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
```

Screen 5-3. Security Violations Detail Report Screen — Page 2

```
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
```

Screen 5-4. Security Violations Detail Report Screen — Page 3

```
list measurements security-violations detail                  Page 4  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
```

Screen 5-5. Security Violations Detail Report Screen — Page 4

Table 5-2. Security Violations Detail Sub-Report

Field	Description
`Login ID`	The login identification submitted by the party attempting to login. Login IDs include the valid 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.
`Port Type`	The port where successful logins and invalid passwords were made upon. G3i: ■ 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. ■ 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. ■ MAINT: These ports on the Expansion Port Networks maintenance boards are typically used as local connections for on site maintenance performed by services. ■ SYS-PORT (System Ports): These ports are accessed by dial-up through the TDM bus. G3i, G3s, G3vs only: ■ *MGR1*: The dedicated system administration terminal connection. ■ *NET*: The network controller dial-up ports. ■ *EPN*: The EPN maintenance EIA port. ■ *INADS*: The Initialization and Administration System port.
`Successful Logins`	Total number of times a login was used successfully to log into the system for the given port type.

NOTE:
If you see a large number of invalid attempts where an invalid ID is used, this may indicate unauthorized use by an individual who does not have access to valid login IDs. On the other hand, if the invalid attempts involve invalid passwords 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.

Monitor Security Violations Report

The security violations reports provide current status information for invalid Login or Remote Access (barrier code) or Authorization Code attempts. The data displayed by these reports is updated every 30 seconds. A total of 16 entries is maintained for each type of violation. The oldest information is overwritten by the new entries at each 30-second update. The security violations report is divided into three distinct reports:

- Login Violations
- Remote Access Barrier Code Violations
- Authorizations Code Violations

To access Monitor Security Violations reports, enter the command interface command **monitor security-violations <report name>**. The report names are “login,” remote-access,” and “authorization-code.”

The following fields are displayed on the Login Violation report:

- **Date:** The date that the attempt occurred.
- **Time:** The time that the attempt occurred.
- **Login:** The login string that was entered as part of the invalid login attempt. An invalid password may cause an invalid attempt. Entry of an invalid password results in an invalid login attempt. In this case the valid login ID associated with the attempt is displayed.
- **Port:** The port on which the failed login session was attempted. The following abbreviations are used for G3i:
  - **MGR1:** The dedicated management terminal connection (the EIA connection to the maintenance board).
  - **NET-N:** A network controller dial up port (1-4).
  - **EPN:** The EPN maintenance EIA port.
  - **INADS:** The INADS port (Initialization and Administration System).
  - **EIA:** Other EIA ports.

  The following abbreviations are used for G3r:

  - **SYSAM-LCL:** Local administration to Manager 1.

- — **SYSAM-RMT:** Dial up port on SYSAM board, typically used by services for remote maintenance, and used by the switch to call out with alarm information.
- — **SYS-PORT:** System ports accessed through TDM bus.
- — **MAINT:** Ports on expansion port network maintenance boards, used as a local connection for on site maintenance.

- **Ext:** The extension assigned to the network controller board that the failed login session was attempted on. This field is present only in the case where the System Manager's SAT is administered through a network controller port.

The following fields are displayed on the Remote Access Violations report:

- **Date:** The date that the attempt occurred.
- **Time:** The time that the attempt occurred.
- **TG No:** The trunk group number associated with the trunk where the remote access attempt terminated.
- **Mbr:** The trunk group member number associated with the trunk where the remote access attempt terminated.
- **Ext:** The extension used to interface with the Remote Access feature.
- **Barrier Code:** The incorrect barrier code that resulted in the invalid attempt.

The following fields are displayed on the Authorization Code Violations report:

- **Date:** The date that the attempt occurred.
- **Time:** The time that the attempt occurred.
- **Originator:** The type of resource originating the call that generated the invalid authorization code access attempt. Originator types include:
  - — Station.
  - — Trunk (other than a trunk assigned to a remote access trunk group).
  - — Remote Access (when the invalid authorization code is associated with an attempt to invoke the Remote Access feature).
  - — Attendant.
- **Auth Code:** The invalid authorization code entered.
- **TG No:** The trunk group number associated with the trunk where the attempt terminated. It appears only when an authorization code is used to access a trunk.
- **Mbr:** The trunk group member number associated with the trunk where the attempt terminated. It appears only when an authorization code is used to access a trunk.

- **Barrier Code:** The incorrect barrier code that resulted in the invalid attempt. It appears only when an authorization code is entered to invoke Remote Access.
- **Ext:** The extension associated with the station or attendant originating the call. It appears only when authorization code is entered from the station or attendant console.

Administering SVN System Parameters

To activate SVN system features, three system level parameters must be administered:

- SVN Login Violation Notification
- SVN Remote Access Violation Notification
- SVN Authorization Code Violation Notification

Administering the SVN Login Security Violation Notification Feature

To administer the SVN feature, enter the command **change system-parameters security**.

To administer system parameters for the login component of the SVN feature violation notification:

1. Access the System Parameter Security form by entering the **change system-parameters security** command from the command line interface.
2. When the SVN Login Violation Notification Enabled field is enabled, the following fields appear on the Security-Related System Parameters form:
   - Originating Extension

     This field requires the entry of an unassigned extension that is local to the switch and conforms to the dial plan for the purpose of originating and identifying SVN referral calls for login security violations.

     The originating extension initiates the referral call in the event of a login security violation. It also sends the appropriate alerting message or display to the referral destination.
   - Referral Destination

     This field requires an entry of an extension, assigned to a station, attendant console, or vector directory number (VDN) that receives the referral call when a security violation occurs. If a VDN is assigned the Time-of-Day routing capability, Call Vectoring may be used to route the referral call to different destinations based on the time of day or the day of the week. The referral destination must be equipped with a display module unless the Announcement Extension is assigned. Administration of the Announcement Extension is also required if the referral destination is a VDN.

- Login Threshold

  This field requires an entry of the minimum number of login attempts that are permitted before a referral call is made. The value assigned to this field, in conjunction with the Time Interval field, determines whether a security violation has occurred. The system default is 5.

- Time Interval

  This field requires the entry of the time interval in which a login security violation must occur. The range for the time interval is one minute to eight hours (0:01 to 7:59), and is entered in the form “xx:xx.” For example, if you want the time interval to be one minute, you enter 0:01. If you want the time interval to be seven and one-half hours, you enter 7:30. The system default is 0:03.

- Announcement Extension

  This field requires an entry of a extension that is assigned to an SVN announcement.

3. Administer an “lsvn-halt” button on any station/attendant console (maximum 1 per system). The SVN button location can be determined by entering the command **display svn-button location.**

Enable/Disable a Login ID

The Disable a Login ID Following a Security Violation field on the Login Administration form is used to set the SVN parameters for a single login. When set to “y” (yes) this SVN disables the specified login ID (system default is y). When set to “n” the SVN feature does not disable the specified login ID if a security violation is detected for the login ID. The Disable a Login ID Following a Security Violation field is dynamic and only appears on the Login Administration form when the login component of the SVN feature is enabled.

To enable a login ID that has been disabled by a security violation, or disabled manually with the command **disable login** the user must:

1. Log in to the switch using a login ID with the correct permissions.
2. Enter the command **enable login <login ID>.**

To disable a login ID, the user must:

1. Log in to the switch using a login ID with the correct permissions.
2. Enter the command **disable login <login ID>**.

List the Status of a Login ID

To list the status of a login ID, the user must:

1. Log in to the switch using a login ID with the correct permissions.
2. Enter the command **list login.**

You see a display indicating the status of the specified login ID. A login ID status can be listed as:

- Login ID status equals **disabled** indicating that the login ID was disabled manually using the **disable login** command.
- Login ID status equals **svn-disabled** indicating that a security violation was detected for that login ID and the login was disabled by the SVN feature.
- Login ID status equals **active** indicating that the login ID is currently logged in.
- Login ID status equals **inactive** indicating that the login ID is not logged in.

Administering Remote Access Security Violation Notification Parameters

To administer the Remote Access component of the SVN feature:

1. Access the System Parameter Security form by entering the **change system-parameters security** command from the command line interface.
2. Enable the Remote Access component of the feature by entering a “y” in the SVN Remote Access Violation Notification field on the System Parameters Security Form.
3. When the SVN Remote Access Violation Notification Enabled field is enabled, the following additional fields appear on the Security-Related System Parameters form:
   - Originating Extension

     This field requires the entry of an unassigned extension that is local to the switch and conforms to the dial plan for the purpose of originating and identifying SVN referral calls for remote access barrier code violations.

     The originating extension initiates the referral call in the event of a Remote Access security violation. It also sends the appropriate alerting message or display to the referral destination.
   - Referral Destination

     This field requires an entry of an extension, assigned to a station, attendant console, or vector directory number (VDN) that receives the referral call when a security violation occurs. If a VDN is assigned the Time-of-Day routing capability, Call Vectoring may be used to route the referral call to different destinations based on the time of day or the day of the week. The referral destination must be equipped with a display module unless the Announcement Extension is assigned. Administration of the Announcement Extension is also required if the referral destination is a VDN.

- Barrier Code Threshold

  This field requires an entry of the minimum number of remote access barrier code attempts that are permitted before a referral call is made. The value assigned to this field, in conjunction with the Time Interval field, determine whether a security violation has occurred. The system default for Barrier code threshold is 10.

- Time Interval

  This field requires the entry of the time interval in which the remote access barrier code attempts must occur. The range for the time interval is one minute to eight hours (0:01 to 7:59), and is entered in the form “xx:xx.” For example, if you want the time interval to be one minute, you enter “0:01.” If you want the time interval to be seven and one-half hours, you enter “7:30.” The system default is 0:03.

- Announcement Extension

  This field requires an entry of a extension that is assigned to the SVN login violation remote access barrier code violation announcement.

4. Administer an “rsvn-halt” button on any station or attendant console (maximum 1 per system). The SVN button location can be determined by entering the command **display svn-button-location.**

Enable/Disable Remote Access Code

To enable remote access that has been disabled following detection of a remote access security violation, or disabled manually with the command **disable remote access**, the user must:

1. Log in to the switch using a login ID with the correct permissions.
2. Enter the command **enable remote access.**

To disable Remote Access, the user must:

1. Log in to the switch using a login ID with the correct permissions.
2. Enter the command **disable login.**

Administering Authorization Code Security Violation Parameters

To administer the Authorization Code component of the SVN feature, the user must:

1. Access the System Parameter Security form by entering the **change system-parameters security** command from the command line interface.
2. When the SVN Authorization Code Violation Notification Enabled field is enabled, the following additional fields appear on the Security-Related System Parameters form:

   - Originating Extension

     This field requires the entry of an unassigned extension that is local to the switch and conforms to the dial plan for the purpose of originating and identifying SVN referral calls for authorization code security violations.

     The originating extension initiates the referral call in the event of a authorization code security violation. It also sends the appropriate alerting message or display to the referral destination.

   - Referral Destination

     This field requires an entry of an extension, assigned to a station, attendant console, or vector directory number (VDN) that receives the referral call when a security violation occurs. If a VDN is assigned the Time-of-Day routing capability, Call Vectoring may be used to route the referral call to different destinations based on the time of day or the day of the week. The referral destination must be equipped with a display module unless the Announcement Extension is assigned. Administration of the Announcement Extension is also required if the referral destination is a VDN.

   - Authorization Code Threshold

     This field requires an entry of the minimum number of invalid authorization code security violations attempts that are permitted before a referral call is made. The value assigned to this field in conjunction with the Time Interval field, determines whether a security violation has occurred. The system default for authorization code security violations threshold is 10.

   - Time Interval

     This field requires the entry of the time interval in which the authorization code security violations must occur. The range for the time interval is one minute to eight hours (0:01 to 7:59), and is entered in the form “x:xx.” For example, if you want the time interval to be one minute, you enter “0:01.” If you want the time interval to be seven and one-half hours, you enter “7:30.” The system default is 0:03.

- Announcement Extension

  This field requires an entry of a extension that is assigned to an SVN authorization code announcement.

3. The SVN button location can be determined by entering the command **display svn-button-location**

```
                  SECURITY-RELATED SYSTEM PARAMETERS


SECURITY VIOLATION NOTIFICATION PARAMETERS

  SVN Login Violation Notification Enabled? y
         Originating Extension:_____         Referral Destination:_____
               Login Threshold: 5_                  Time Interval:0:03
        Announcement Extension:

  SVN Remote Access Violation Enabled? y
         Originating Extension:_____         Referral Destination:_____
        Barrier Code Threshold: 10                  Time Interval: 0:03
        Announcement Extension:_____

  SVN Authorization Code Violation Notification Enabled? y
         Originating Extension:_____         Referral Destination:_____
  Authorization Code Threshold: 10                  Time Interval: 0:03
        Announcement Extension:_____
```

Screen 5-6. System-Parameters Security Form

```
                                 REMOTE ACCESS

    Remote Access Extension:________         Barrier Code Length:____
Authorization Code Required?_            Remote Access Dial Tone?_


Barrier Code   COR    COS    Expiration Date   No. of Calls    Calls Used
1:________     1__    1__    __/__/__          ______          ______
2:________     1__    1__    __/__/__          ______          ______
3:________     1__    1__    __/__/__          ______          ______
4:________     1__    1__    __/__/__          ______          ______
5:________     1__    1__    __/__/__          ______          ______
6:________     1__    1__    __/__/__          ______          ______
7:________     1__    1__    __/__/__          ______          ______
8:________     1__    1__    __/__/__          ______          ______
9:________     1__    1__    __/__/__          ______          ______
10:_______     1__    1__    __/__/__          ______          ______


Permanently Disable? __       Disable Following A Security Violation? _
(Note:  You must logoff to affect permanent disabling of Remote Access)
```

Screen 5-7. Remote Access Form

```
      --------------------------------------------------------------------------
      --------------------------------------------------------------------------
                            SVN BUTTON LOCATIONS

                          LOGIN SECURITY VIOLATIONS

                               Name:___________________
                          Extension:_________


           REMOTE ACCESS SECURITY VIOLATIONS

                               Name:___________________
                          Extension:_________

                          AUTHORIZATION CODE SECURITY VIOLATIONS


                               Name:___________________
                          Extension:_________
      --------------------------------------------------------------------------
      --------------------------------------------------------------------------
```

Screen 5-8. SVN Button Location Form

```
---------------------------------------------------------------------------
monitor security-violations login
---------------------------------------------------------------------------
                      SECURITY VIOLATIONS STATUS
                                      Date:  NN:nn DAY MON nn 199n


                               LOGIN VIOLATIONS


                  Date    Time     Login     Port      Ext
                 01/08    07:51    root      NET-1     4030
                 01/08    07:51    admin     NET-1     4030
                 01/07    07:52    cust      rcust   MGR1
---------------------------------------------------------------------------
---------------------------------------------------------------------------
```

Screen 5-9. Monitor Security Violations Report (Login)

```
---------------------------------------------------------------------------
monitor security-violations remote-access
---------------------------------------------------------------------------
                      SECURITY VIOLATIONS STATUS
                                      Date:  NN:nn DAY MON nn 199n


                  REMOTE ACCESS BARRIER CODE VIOLATIONS
                  Date     Time     TG No   Mbr   Ext   Barrier Code
                  01/08    10:55    31      5     4050  1030
                  01/08    10:54    31      1     4050  2345










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

Screen 5-10. Monitor Security Violations Report (Remote Access)

```
     ----------------------------------------------------------------------
     monitor security-violations authorization-code
     ----------------------------------------------------------------------
                         SECURITY VIOLATIONS STATUS
                        Date:  NN:nn DAY MON nn 199n

                        AUTHORIZATION CODE VIOLATIONS


Date   Time    Originator     Auth Code  TG No   Mbr   Barrier Code   Ext
01/07  08:33   STATION        1234567                                 84321
01/06  07:32   TRUNK           1233555      35       14
01/03  14:22   REMOTE ACCESS  2222         31       3    3295912
12/25  16:45   ATTENDANT      1212111                                 84000



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

Screen 5-11. Monitor Security Violations Report (Authorization Code)

```
     ----------------------------------------------------------------------
     ----------------------------------------------------------------------
    Switch Name:______________        Date: xx:xx am  DAY MON xx, 19xx

                   SECURITY VIOLATIONS SUMMARY REPORT
               Counted Since: xx:x am   DAY MON xx,19xx

            Barrier Codes                  Authorization Codes
                     Security                                  Security
     Valid  Invalid  Violations   Originator  Valid  Invalid  Violations
    xxxxxxx  xxxxxxx  xxxxxxx     Station    xxxxxxx  xxxxxxx  xxxxxxx
                                  Trunk      xxxxxxx  xxxxxxx  xxxxxxx
                               Remote Access xxxxxxx  xxxxxxx  xxxxxxx
             Attendant   xxxxxxx  xxxxxxx  xxxxxxx
              Total      xxxxxxx  xxxxxxx  xxxxxxx

               Successful  Invalid  Invalid   Forced    Login Security  Trivial
     Port Type Logins      Attempts IDs     Disconnects  Violations     Attempts
     SYSAM-LCL xxxxx       xxxxx    xxxxx   xxxxx        xxxxx          xxxxx
     SYSAM-RMT xxxxx       xxxxx    xxxxx   xxxxx        xxxxx          xxxxx
     MAINT     xxxxx       xxxxx    xxxxx   xxxxx        xxxxx          xxxxx
     SYS-PORT  xxxxx       xxxxx    xxxxx   xxxxx        xxxxx          xxxxx

     Total     xxxxx       xxxxx    xxxxx   xxxxx        xxxxx          xxxxx
     ----------------------------------------------------------------------
     ----------------------------------------------------------------------
```

Screen 5-12. Security Violations Traffic Summary Report

References

6

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 **555-025-101**

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 3 Feature Description **555-230-204**

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. Communications 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 DocuMaster 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 codes.
- 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 ACD Agent **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 ACD Supervisor **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 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 **555-230-104**

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 V1 and V2 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 1, Generic 3i, Generic 3i-Global, and Generic 3i V2 Maintenance **555-204-105**

Provides the information necessary for monitoring, testing, and maintaining DEFINITY Generic 3i. It is intended to cover many of the faults and troubles that can occur in the system.

DEFINITY. Communications System Generic 3 V1.1 and V2 Upgrades and Additions **555-230-107**

Provides procedures and information required to upgrade from earlier DEFINITY Communications systems to a DEFINITY Generic 3 V1.1 or V2 system and to make additions to an existing system after the initial switch installation.

DEFINITY. Communications System Generic 3 System Description and Specifications **555-230-206**

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 3 V2 Implementation **555-230-653**

Provides the procedures and associated forms for collecting system and terminal software information for G3 V2 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 3 Basic Call Management Operations **555-230-704**

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 routing, 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 **585-229-201**

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 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													
T													
W													
T													
F													
S													
S													
M													
T													
W													
T													
F													
S													
S													
M													
T													
W													
T													
F													
S													
S													

* Report Type: LH for last hour, TP for today’s peak, or YP for yesterday’s peak.

WORKSHEET 2

ARS/AAR ROUTING 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 Pref 1	Pref 2	Pref 3	Pref 4	Pref 5	Pref 6	Week No. and Date
M												
T												
W												
T												
F												
S												
S												
M												
T												
W												
T												
F												
S												
S												
M												
T												
W												
T												
F												
S												
S												
M												
T												
W												
T												
F												
S												
S												

* Use ‘‘Yesterday’s report’’ for the full day route-pattern measurement.

WORKSHEET 3

HUNT GROUP DATA WORKSHEET

System ID: **Location:** **Group Name:**
Group ID: **Group Size:** **Group Type:**
Queue Size:

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								
S								
M								
T								
W								
T								
F								
S								
S								
M								
T								
W								
T								
F								
S								
S								
M								
T								
W								
T								
F								
S								
S								

* Report Type: LH for last hour, TP for today's peak, or YP for yesterday'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													
F													
S													
S													
M													
T													
W													
T													
F													
S													
S													
M													
T													
W													
T													
F													
S													
S													
M													
T													
W													
T													
F													
S													
S													

* Report Type: LH for last hour, TP for today's peak, or YP for yesterday's peak

WORKSHEET 5

WIDEBAND TRUNK GROUP DATA WORKSHEET

System ID: **Location:** **Service Type:**
Group No: **Group Size:** **Group Dir:**

Day of Week	Report Type*	Meas Hour	Total Usage	Total Seize	Inc. Seize	Grp Ovfl	Out Serv	% ATB	% Out Blk	Week No. and Date
M										
T										
W										
T										
F										
S										
S										
M										
T										
W										
T										
F										
S										
S										
M										
T										
W										
T										
F										
S										
S										
M										
T										
W										
T										
F										
S										
S										

* Report Type: LH for last hour, TP for today's peak, or YP for yesterday's peak

WORKSHEET 6

PROCESSOR OCCUPANCY SUMMARY DATA WORKSHEET

System ID: **Location:**

Day of Week	Peak Hour	Stat Occ	CP Occ	SM Occ	Idle Occ	Total Calls	Tandem Calls	Total ATMPT	INTCOM ATMPT	INC ATMPT	OUT ATMPT	PNET ATMPT	Week No. and Date
M													
T													
W													
T													
F													
S													
S													
M													
T													
W													
T													
F													
S													
S													
M													
T													
W													
T													
F													
S													
S													
M													
T													
W													
T													
F													
S													
S													
4 Week Avg	NA												

''NA'' means that the field () should not be calculated. It is not applicable.

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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)	______________
General Business Vectoring (Note)	______________
Total	100%

NOTE: General Business Vectoring applies to incoming calls that use Call Vectoring and terminate to destinations other than ACD splits.

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 10/11 Digit Calls	______________
	Total	100%
Private Networking	Incoming Answered	______________
	Incoming Coverage (Note 1)	______________
	Outgoing	______________
	Tandem	______________
	Total	100%

Notes:

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 CDR ports used (maximum 2) ______________

5. Specify the percentage of calls on Intra-Switch CDR ______________

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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 CDR	_______________

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.

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 CDR	______________

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 ______________

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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	

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 for Agents, Splits, & Trunk Status			X
— ASAI Call Termination (3rd Party Drop/Clear Call)		X	X
— User/Switch Classified 3rd Party Make Calls			X
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.

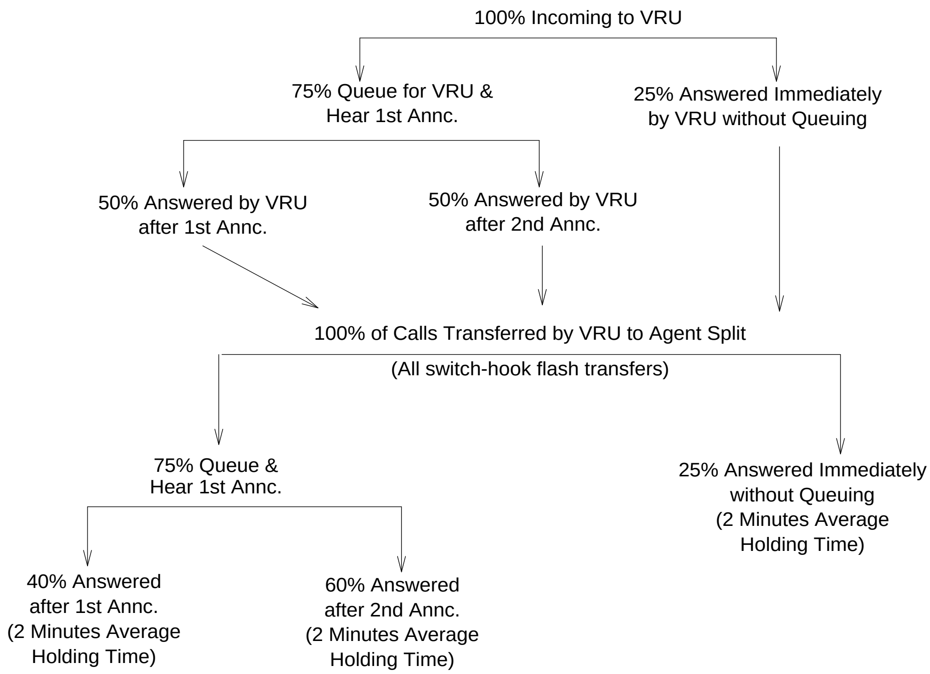

Figure A-1. Sample ACD — ICM Call Flow

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.

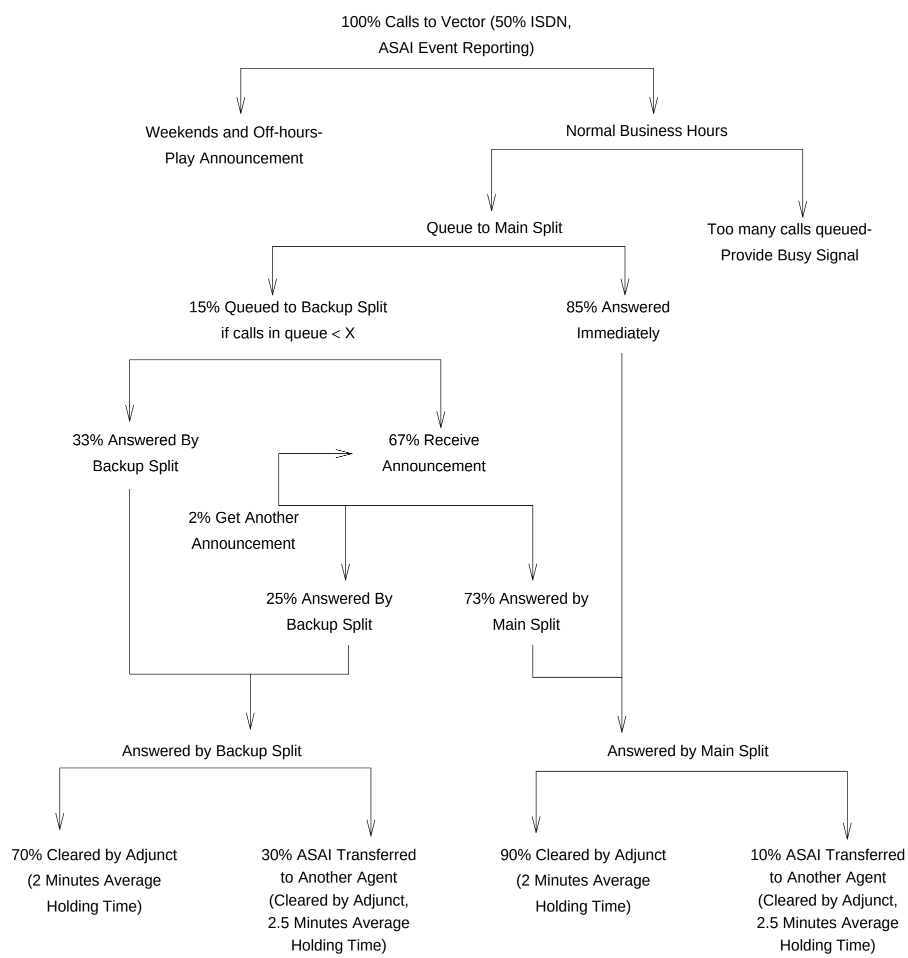

Figure A-2. Sample Call Vectoring Call Flow

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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 secs 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 secs hearing ringback
9. Announcement 7010
10. Wait time 30 secs 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.

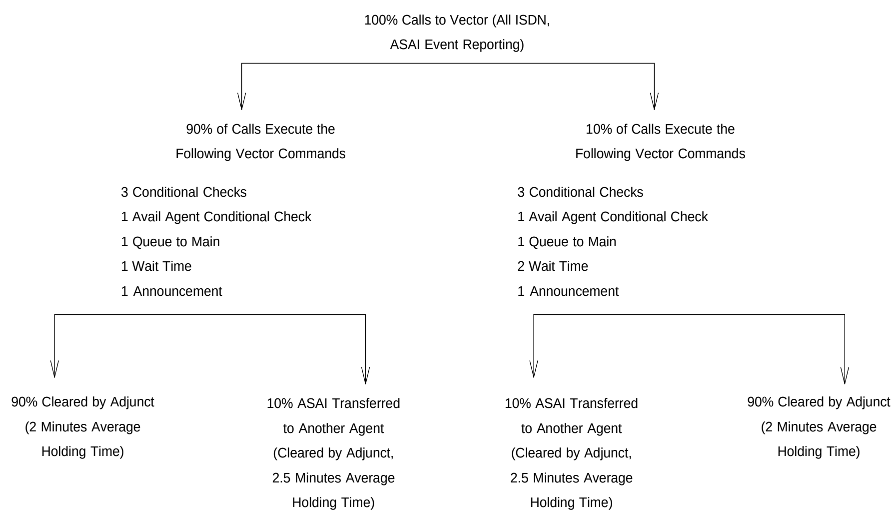

Figure A-3. Sample ICM Call Vectoring Call Flow

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.

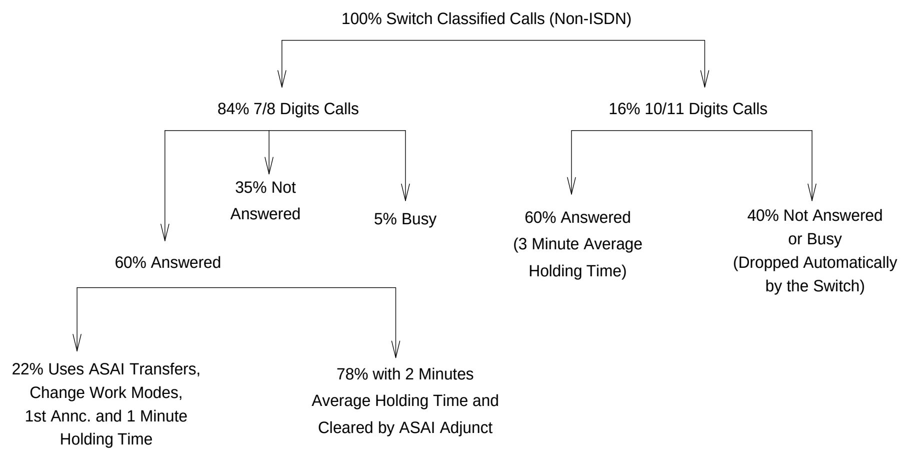

Figure A-4. Sample OCM Call Flow

Printer Options

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 match the data module.

Abbreviations

Numerics

A

AA
Archangel

AAR
Automatic Alternate Routing

AC
Alternating Current

ACA
Automatic Circuit Assurance

ACB
Automatic Callback

ACD
Automatic Call Distribution

ACU
Automatic Call Unit

ACW
After Call Work

AD
Abbreviated Dialing

ADAP
AUDIX Data Acquisition Package

ADM
Asynchronous Data Module

ADU
Asynchronous Data Unit

AE
Access Endpoint

AIM
Asynchronous Interface Module

AIOD
Automatic Identification of Outward Dialing

ALM-ACK
Alarm Acknowledge

AMW
Automatic Message Waiting

AN
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

AUX
Auxiliary

AVD
Alternate Voice/Data

AWOH
Administration Without Hardware

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

BN
Billing Number

BOS
Bit Oriented Signaling

BPN
Billed Party Number

BPS
Bits Per Second

BRI
Basic Rate Interface

BTU
British Thermal Unit

C

CA-TSC
Call-Associated Temporary Signaling Connection

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, Call Accounting System

CBC
Call-By-Call and Coupled Bonding Conductor

CC
Country Code

CCIS
Common Channel Interoffice Signaling

CCITT
Consultative Committee for International Telephone and Telegraph

CCMS
Common Channel Message Set

CCS
Centum (Hundred) Call Seconds

CCSA
Common Control Switching Arrangement

CDM
Channel Division Multiplexing

CDOS
Customer-Dialed and Operator Serviced

CDR
Call Detail Recording

CDRP
Call Detail Record Poller

CDRR
Call Detail Recording and Reporting

CDRU
Call Detail Recording Utilities

CEM
Channel Expansion Multiplexing

CEPT1
European Conference of Postal and Telecommunications Rate 1

CI
Clock Input

cm
Centimeter

CM
Connection Manager

CMDR
Centralized Message Detail Recording

CMS
Call Management System

CO
Central Office

COR
Class of Restriction

COS
Class of Service

CP
Circuit Pack

CPE
Customer Premises Equipment

CPN
Called-Party Number

CPN/BN
Calling Party Number/Billing Number

CPTR
Call Progress Tone Receiver

CRC
Cyclical Redundancy Checking

CSA
Canadian Safety Association

CSCN
Center Stage Control Network

CSD
Customer Service Document

CSM
Centralized System Management

CSS
Center Stage Switch

CSSO
Customer Services Support Organization

CSU
Channel Service Unit

CTS
Clear to Send

CWC
Call Work Codes

D

DAC
Dial Access Code or Direct Agent Calling

dB
Decibel

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

DIVA
Data In/Voice Answer

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 Dialing

DOSS
Delivery Operations Support System

DOT
Duplication Option Terminal

DPM
Dial Plan Manager

DPR
Dual Port RAM

DS1
Data Services Level 1

DS1C
Digital Signal Level-1 Converter

DSI
Digital Signal Interface

DSU
Data Service Unit

DTDM
Digital Terminal Data Module

DTE
Data Terminal Equipment

DTGS
Direct Trunk Group Select

DTMF
Dual-Tone Multifrequency

DTS
Disk Tape System

DXS
Direct Extension Selection

E

E&M
Ear and Mouth (receive and transmit)

EAA
Expansion Archangel

EAL
Expansion Archangel Link

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

ETA
Extended Trunk Access

ETN
Electronic Tandem Network

ETSI
European Telecommunications Standards Institute

F

FAC
Feature Access Code

FAS
Facility-Associated Signaling

FAT
Facility Access Trunk

FAX
Facsimile

FCC
Federal Communications Commission

FEAC
Forced Entry of Account Codes

FEP
Front End Processor

FIC
Facility Interface Codes

FNPA
Foreign Numbering-Plan Area

FRL
Facilities Restriction Level

FX
Foreign Exchange

G

G3-MA
Generic 3 Management Applications

G3-MT
Generic 3 Management Terminal

G3r
Generic 3, RISC (Reduced Instruction Set Computer)

GM
Group Manager

GPTR
General-Purpose Tone Receiver

GRS
Generalized Route Selection

H

HNPA
Home Numbering Plan Area Code

Hz
Hertz

I

IAS
Inter-PBX Attendant Service

IC
Inter-Cabinet

ICC
Intercarrier Cable

ICD
Inbound Call Director

ICDOS
International Customer Dialed Operator Serviced

ICHT
Incoming Call-Handling Table

ICI
Incoming Call Identifier

ICM
Inbound Call Management

IDDD
International Direct Distance Dialing

IDF
Intermediate Distribution Frame

IE
Information Element

IMT
Intermachine Trunk

in
Inch

INADS
Initialization and Administration System

INS
ISDN Network Service

INWATS
Inward Wide Area Telephone Service

IO
Information Outlet

ISDN
Integrated Services Digital Network

ISN
Information Systems Network

ISO
International Standards Organization

ISV
Independent Software Vendor

ITP
Installation Test Procedures

ITU
International Telecommunications Union

IXC
Interexchange Carrier Code

K

kHz
Kilohertz

kbps
Kilobits Per Second

kbyte
Kilobyte

kg
Kilogram

L

LAP-D
Link Access Procedure on the D-channel

LAPD
Link Access Procedure Data

LATA
Local Access and Transport Area

lb
Pound

LDN
Listed Directory Number

LDS
Long-Distance Service

LEC
Local Exchange Carrier

LED
Light-Emitting Diode

LINL
Local Indirect Neighbor Link

LSU
Local Storage Unit

LWC
Leave Word Calling

M

M-Bus
Memory Bus

MA-UUI
Message Associated User-to-User Signaling

MADU
Modular Asynchronous Data Unit

MAP
Maintenance Action Process

Mbps
Megabits Per Second

MCC
Multi-Carrier Cabinet

MCS
Message Center Service

MDF
Main Distribution Frame

MDM
Modular Data Module

MDR
Message Detail Record

MEM
Memory

MET
Multibutton Electronic Telephone

MHz
Megahertz

MIM
Management Information Message

MIS
Management Information System

MISCID
Miscellaneous Identification

MMS
Material Management Services

MOS
Message-Oriented Signaling

MPDM
Modular Processor Data Module

MS
Message Server

ms
Millisecond

MS/T
Main Satellite/Tributary

MSA
Message Servicing Adjunct

MSG
Message Service

MSM
Modular System Management

MSS
Mass Storage System

MSSNET
Mass Storage/Network Control

MT
Management Terminal

MTDM
Modular Trunk Data Module

MTP
Maintenance Tape Processor

MTT
Multi-Tasking Terminal

MWL
Message Waiting Lamp

Mbps
Megabits Per Second

Mbyte
Megabytes

N

NANP
North American Numbering Plan

NAU
Network Access Unit

NCA/TSC
Non-Call Associate/Temporary Signaling Connection

NCOSS
Network Control Operations Support Center

NCSO
National Customer Support Organization

NEC
National Engineering Center

NEMA
National Electrical Manufacturer's Association

NFAS
Non-Facility Associated Signaling

NID
Network Inward Dialing

NM
Network Management

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

ONS
On-Premises Station

OPS
Off-Premises Station

OQT
Oldest Queued Time

OSHA
Occupational Safety and Health Act

OSI
Open Systems Interconnect

OSS
Operations Support System

OSSI
Operations Support System Interface

OTQ
Outgoing Trunk Queuing

P

PACCON
Packet Control

PAD
Packet Assembly/Disassembly

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

PGATE
Packet Gateway

PGN
Partitioned Group Number

PI
Processor Interface

PIB
Processor Interface Board

PIDB
Product Image Database

PKTINT
Packet Interface

PL
Private Line

PLS
Premises Lightwave System

PMS
Property Management System

PN
Port Network

PNA
Private Network Access

PNL
Port Network Link

POP
Point Of Presence

PPN
Processor Port Network

PRI
Primary Rate Interface

PROCR
Processor

PSC
Premises Service Consultant

PSDN
Packet Switch Public Data Network

PT
Personal Terminal

PTC
Positive Temperature Coefficient

PTT
Postal Telephone and Telegraph

R

RAM
Random Access Memory

RBS
Robbed-Bit Signaling

RCL
Restricted Call List

RFP
Request For Proposal

RHNPA
Remote Home Numbering Plan Area

RINL
Remote Indirect Neighbor Link

RISC
Reduced Instruction Set Computer

RLT
Release Link Trunk

RMATS
Remote Maintenance, Administration, and Traffic System

RNX
Route Number Index (Private Network Office Code)

ROM
Read-Only Memory

RPN
Routing Plan Number

RS232C
Recommended Standard 232C

RS449
Recommended Standard 449

RSC
Regional Support Center

S

SABM
Set Asynchronous Balance Mode

SAKI
Sanity and Control Interface

SAT
System Access Terminal

SCC
Single Carrier Cabinet

SCD
Switch-Control Driver

SCI
Switch Communications Interface

SCO
System Control Office

SCOTCH
Switch Conferencing for TDM Bus in Concentration Highway

SCSI
Small Computer System Interface

SDDN
Software Defined Data Network

SDI
Switched Digital International

SDLC
Synchronous Data Link Control

SDN
Software Defined Network

SID
Station Identification Number

SIT
Special Information Tones

SMDR
Station Message Detail Recording

SN
Switch Node

SNA
Systems Network Architecture

SNL
Switch Node Link

SNC
Switch Node Clock

SNI
Switch Node Interface

SPE
Switch Processing Element

SPID
Service Profile Identifier

SSI
Standard Serial Interface

SSM
Single Site Management

SSV
Station Service

ST3
Stratum 3 Clock Board

STARLAN
Star-Based Local Area Network

SVN
Security Violation Notification

SXS
Step-by-Step

SYSAM
System Access and Administration

T

TAAS
Trunk Answer from Any Station

TAC
Trunk Access Code

TC
Technical Consultant

TCM
Traveling Class Mark

TDM
Time-Division Multiplex(ing)

TDR
Time of Day Routing

TEG
Terminating Extension Group

TEI
Terminal Endpoint Identifier

TOD
Time of Day

TOP
Task 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

UM
User Manager

UNMA
Unified Network Management Architecture

UNP
Uniform Numbering Plan

UPS
Uninterruptible Power Supply

USOP
User Service Order Profile

UUCP
UNIX-to-UNIX Communications Protocol

UUI
User-to-user information

V

VAR
Value Added Reseller

VDN
Vector Directory Number

VIS
Voice Information System

VLSI
Very Large Scale Integration

VM
Voltmeter

VNI
Virtual Nodepoint Identifier

W

WATS
Wide Area Telecommunications Service

WCC
World Class Core

WSA
Waiting Session Accept

Z

ZCS
Zero Code Suppression

Glossary

A

Abandoned Call
An incoming or intercom call where the caller hangs up before the call is 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 1 through 99(G3i) and 1 through 255(G3r). 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.

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 3 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.

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.

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 Holding Time
The average length of time, in seconds, a facility (such as trunk) is used to serve a 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.

B

Busy Hour Call Capacity (BHCC)
The maximum number of completed calls the switch processor can support in an hour without degradation of service.

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).

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 inbound call prompting applications. In addition, they are also used for MFC detection. There are two types of call classifiers:

- **Touch Tone Receivers (TTRs)** 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 (CPTRs)** detect call progress tones such as dialtone and answer tones.
- **Multifrequency Compelled Receivers (MFCRs)** detect incoming MFC tones and respond with appropriate 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-call 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 served 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 error event 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. 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 all 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 an ACD hunt group, that directly receives calls from one or more trunk groups.

System Administrator
The designated individual who maintains overall customer responsibility for system administration. Generally, all administration functions are performed from the G3-MT. 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 may be used to print scheduled reports via the Report Scheduler.

T

Talk Time
The total time that the servers 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 Allocation Plan (UAP)
A defined strategy for dynamically allocating ISDN-PRI trunking facilities to competing network services/features in a call-by-call trunk group.

Usage
The time, typically expressed in CCS, during which resources are in use. This is also called the traffic load.

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