Meridian 1
Succession 1000
Succession 1000M
Succession 3.0 Software

Traffic Measurement

Formats and Output

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Standard 1.00. This document is issued to support the Succession 3.0. It was created to support a restructuring of the Documentation Library. This document contains information previously contained in the following legacy document, now retired: *Traffic Measurement: Formats and Output* (553-2001-450).

Contents

About this document

This document is a global document. Contact your system supplier or your Nortel Networks representative to verify that the hardware and software described is supported in your area.

Subject

This NTP provides information on how traffic data is accumulated, processed, and output, and how to interpret the traffic reports. The available traffic reports are system reports, customer reports, customer network reports, threshold reports, and traffic report on selected terminals.

Note on legacy products and releases

This NTP contains information about systems, components, and features that are compatible with Succession 3.0 Software. For more information on legacy products and releases, click the **Technical Documentation** link under **Support** on the Nortel Networks home page:

http://www.nortelnetworks.com/

Applicable systems

This document applies to the following systems:

- Meridian 1 Option 11C Chassis
- Meridian 1 Option 11C Cabinet
- Meridian 1 Option 51C
- Meridian 1 Option 61
- Meridian 1 Option 61C

- Meridian 1 Option 61C CP PII
- Meridian 1 Option 81
- Meridian 1 Option 81C
- Meridian 1 Option 81C CP PII
- Succession 1000
- Succession 1000M Cabinet
- Succession 1000M Chassis
- Succession 1000M Half Group
- Succession 1000M Single Group
- Succession 1000M Multi Group

Note that memory upgrades may be required to run Succession 3.0 Software on CP3 or CP4 systems (Options 51C, 61, 61C, 81, 81C).

System migration

When particular Meridian 1 systems are upgraded to run Succession 3.0 Software and configured to include a Succession Signaling Server, they become Succession 1000M systems. Table 1 lists each Meridian 1 system that supports an upgrade path to a Succession 1000M system.

Table 1
Meridian 1 systems to Succession 1000M systems (Part 1 of 2)

This Meridian 1 system...	Maps to this Succession 1000M system
Meridian 1 Option 11C Chassis	Succession 1000M Chassis
Meridian 1 Option 11C Cabinet	Succession 1000M Cabinet
Meridian 1 Option 51C	Succession 1000M Half Group
Meridian 1 Option 61	Succession 1000M Single Group
Meridian 1 Option 61C	Succession 1000M Single Group
Meridian 1 Option 61C CP PII	Succession 1000M Single Group

Table 1
Meridian 1 systems to Succession 1000M systems (Part 2 of 2)

This Meridian 1 system...	Maps to this Succession 1000M system
Meridian 1 Option 81	Succession 1000M Multi Group
Meridian 1 Option 81C	Succession 1000M Multi Group
Meridian 1 Option 81C CP PII	Succession 1000M Multi Group

Note the following:

- When an Option 11C system is upgraded to run Succession 3.0 Software, that system becomes a Meridian 1 Option 11C Cabinet.
- When an Option 11C Mini system is upgraded to run Succession 3.0 Software, that system becomes a Meridian 1 Option 11C Chassis.

For more information, see one or more of the following NTPs:

- *Small System: Upgrade Procedures* (553-3011-258)
- *Large System: Upgrade Procedures* (553-3021-258)
- *Succession 1000 System: Upgrade Procedures* (553-3031-258)

Intended audience

This document is intended for maintenance technicians, system operators, and system managers needing detailed information on types of calls, call completion rates, call failures, waiting periods, and other vital data.

Conventions

Terminology

In this document, the following systems are referred to generically as "system":

- Meridian 1
- Succession 1000
- Succession 1000M

The following systems are referred to generically as "Small System":

- Succession 1000M Chassis
- Succession 1000M Cabinet
- Meridian 1 Option 11C Chassis
- Meridian 1 Option 11C Cabinet

The following systems are referred to generically as "Large System":

- Meridian 1 Option 51C
- Meridian 1 Option 61
- Meridian 1 Option 61C
- Meridian 1 Option 61C CP PII
- Meridian 1 Option 81
- Meridian 1 Option 81C
- Meridian 1 Option 81C CP PII
- Succession 1000M Half Group
- Succession 1000M Single Group
- Succession 1000M Multi Group

The call processor in Succession 1000 and Succession 1000M systems is referred to as the "Succession Call Server".

Related information

NTPs

The following NTPs are referenced in this document:

- *Dialing Plans: Description* (553-3001-183)
- *Features and Services* (553-3001-306)
- *Software Input/Output: Administration* (553-3001-311)
- *ISDN Primary Rate Interface: Features* (553-3001-369)
- *Basic Network Features* (553-3001-379)
- *ISDN Basic Rate Interface: Features* (553-3001-380)
- *Software Input/Output: System Messages* (553-3001-411)
- *Software Input/Output: Maintenance* (553-3001-511)
- *Large System: Planning and Engineering* (553-3021-120)

Online

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NTPs on CD-ROM

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Traffic overview

Contents

This section contains information on the following topics:

Introduction

The systems accumulate traffic data during normal call processing. This data is processed to provide regularly scheduled reports. This section provides information on how traffic data is accumulated, processed, and output. It also provides important information on how to interpret the traffic reports.

Typical traffic measurements include the following:

Peg count

A peg count is a count of an event, such as call completion.

Failure to match (FTM)

A failure to match is a count of the number of times an idle network path could not be found between two connection points.

Usage

The usage of a resource such as a trunk or a conference is the time measurement, in 100 call seconds (CCS), of how long the resource has been busy. The usage time is normally calculated when the resource becomes idle.

Established path

An established path is a path between two terminals when both are talking to each other. Outgoing calls are not considered established until the end-of-dialing timers have expired, as set in the software. Incoming calls are not established until answer supervision is returned.

Service loop

A service loop is either a tone and digit switch loop or a multifrequency (MF) sender loop.

Network loop

A network loop provides path switching and control for stations and trunks connected to it.

The traffic data is accumulated for many of the system resources, such as lines, trunks, and network loops. The data is processed on a scheduled basis and output in various reports. The Traffic Overlay (LD 02) is used to set the traffic options.

The traffic reporting system saves system-generated traffic reports in a Traffic Log File rather than in the History File.

Traffic Overlay (LD 02)

LD 02 is used to:

- set traffic report schedules and options
- set the type of reports to be generated
- set system date, time, and daily time adjustment
- set or query the system identification (ID)
- set thresholds
- reset the system clock when daylight savings time begins and ends
- print or perform threshold tests on the last reports

The Traffic commands are provided at the end of this document (see “Traffic (LD 02)” on page 145) and in the following NTPs:

- *Software Input/Output: Administration* (553-3001-311)
- *Software Input/Output: System Messages* (553-3001-411)
- *Software Input/Output: Maintenance* (553-3001-511).

Report schedules

The traffic reports can be output for the following:

- on selected days of the week during a defined period of the year, specified by start day and end day
- for any defined period of the day (for example, from 8 a.m. to 5 p.m.)
- every hour or half hour as follows:
  - hourly, on the hour
  - hourly, on the half hour
  - half-hourly, on the hour and half hour

Customer reports can have different schedules.

Time and date

Manual adjustment

The time of day and date of the system can be queried and adjusted manually. Manual adjustment is required after a sysload.

Automatic adjustment

To compensate for tolerances in the system clock, the time of day can be automatically adjusted during the midnight routines.

The time of day and date of the system can also be adjusted automatically. When the Network Time Synchronization feature is equipped, a node can obtain proper clock updates automatically from a Master node (clock) over the Integrated Services Digital Network (ISDN). Further information is provided in the description of the Network Time Synchronization feature in the *ISDN Primary Rate Interface: Features* (553-3001-369) and *ISDN Basic Rate Interface: Features* (553-3001-380).

Note: Since the traffic measurement schedule and midnight routines reference the time-of-day clock, these programs can be inadvertently triggered by time adjustment. For example, adjusting the time from 11:05 to 10:55 results in the output of traffic data when the system clock reads 11:00, provided output is scheduled.

System identification

The system ID is required when the system is controlled from a central administration center. The system ID identifies the system from which the traffic measurements originate. Each system is identified by a unique 1- to 4-digit number that is output as part of the traffic data.

The system ID is assigned to the system when the traffic measurement schedules and options are defined. It is input the first time traffic schedules are defined. When traffic schedules or options are changed, the system ID number need not be redefined. The system ID can also be changed using the Configuration Record 1 Overlay (LD 17).

Types of traffic reports

The following traffic reports are available:

- System reports
- Customer reports
- Customer network reports
- Threshold reports
- Traffic report on selected terminals

System reports

System reports are identified by the prefix TFS. The three-digit code following the prefix identifies the type of report.

TFS001 – networks

TFS002 – service loops

TFS003 – dial tone delay

TFS004 – processor load

TFS005 – selected terminals

TFS007 – junctor group

TFS008 – Command Status Links and Application Module Links

TFS009 – D-channel (DCH)

TFS010 – ISDN GF Transport

TFS011 – Multi-purpose ISDN Signaling Processor traffic

TFS012 – Multi-purpose ISDN Signaling Processor D-channel management

TFS014 – ISDN BRI trunk DSL system report

TFS013 – Multi-purpose ISDN Signaling Processor messages

TFS015 – Meridian Packet Handler (MPH)

Customer reports

Customer reports are identified by the prefix TFC. The three-digit code following the prefix identifies the type of report.

TFC001 – networks

TFC002 – trunks

TFC003 – customer console measurements

TFC004 – individual console measurements

TFC005 – feature key usage

TFC006 – Radio Paging

TFC007 – Call Park

TFC008 – messaging and auxiliary processor links

TFC009 – Network Attendant Service

TFC010 – ISPC link establishment

TFC111 – use of broadcasting routes

Customer network reports

Customer network measurements are identified by the prefix TFN. The three-digit code following the measurement identifies the type of report.

TFN001 – route lists measurement

TFN002 – Network Class of Service measurements

TFN003 – incoming trunk group measurements

Threshold reports

Various traffic thresholds can be defined to monitor system performance. When a threshold is reached, a warning message is output. For example, a threshold for attendants' average speed of answer can be defined. If this value is exceeded in a report period, then a TFC103 warning message is output. In addition, the two attendant console reports (TFC003 and TFC004) are generated, even if they are disabled. Threshold warnings may indicate the need for additional resources, such as more attendants.

The following system or customer thresholds can be defined. For each threshold there is an equivalent traffic report.

TFS101 – dial tone speed

TFS102 – loop traffic

TFS103 – junctor group traffic

TFS104 – superloop traffic

TFC101 – incoming matching loss

TFC102 – outgoing matching loss

TFC103 – average Speed of Answer

TFC104 – percent All Trunks Busy

TFC105 – percent OHQ overflow

TFN101 – off hook queue overflow threshold

Traffic report on selected terminals

Selected lines and trunks can be defined for special traffic measurement. In addition to the normal traffic measurements, additional peg counts and usage measurements are made for this set of terminals. Lines and trunks to be included in this set are given the Individual Traffic Measurement (ITM) class of service in the Traffic program. Attendants cannot be given the ITM class of service.

Traffic collection

The systems have five traffic data collection stages: accumulate, hold, print, control, and output.

Accumulate

When the system takes any measured action, the associated counters are updated. Traffic information is automatically accumulated as the events take place, regardless of schedules or thresholds. When the measurements are transferred to the holding register, the accumulating register returns to zero for the next tracking period.

Note: Measurements totaling less than 50 call seconds are recorded as 0 CCS.

Hold

According to the defined schedules, traffic information is transferred from the accumulating registers to the holding registers. Each accumulating register has an associated holding register.

View or print data in the holding registers whenever desired. The information remains in the holding register until the next scheduled transfer.

Some measurements have thresholds. When the information is transferred into the holding register, the thresholds are checked. If the thresholds are exceeded, a message is printed.

Print

Once data is in the holding registers, it can be printed whenever desired, before the next scheduled transfer. Additionally, in LD 02, the holding registers can be accessed and any aspect of the traffic measurement information printed. Traffic data can only be printed when it is in the holding register.

Note: Depending on the type and amount of information, a high-speed printer may be required.

Control

Traffic measurement variables (such as options and schedules) are accessed in LD 02. See *Software Input/Output: Administration* (553-3001-311), *Software Input/Output: System Messages* (553-3001-411), and the *Software Input/Output: Maintenance* (553-3001-511) for complete information.

Output

Traffic information is output according to the schedules defined in LD 02. When data is being printed at the teletype (TTY), the output rate depends on the system time available. Information can be printed all at once, or it can be printed at intervals. Data output begins when the information enters the holding registers, and it ends before the next scheduled transfer.

Factors affecting traffic data

Any change in the system, such as a sysload or under- or over-use of facilities, can cause discrepancies in the data collected. In most cases, warning messages alert the user that the data may have been corrupt.

Sysload and initialization

A sysload or system initialization causes traffic data in the accumulating and holding registers to be lost. After sysload, any changes to traffic schedules, traffic options, or threshold levels made since the last Equipment Data Dump (EDD) must be redefined using LD 02. After a sysload, two traffic report periods are required to produce a real-time usage count.

After an initialization, a TFS301 message precedes traffic reports output. The message warns that the initialization has corrupted the traffic data because the data was not collected over the entire hour or half hour. Ignore the first traffic reports after an initialization.

A TFS302 message warns that the traffic schedule was changed during the last hour or half hour. Traffic reports following this message may be invalid if the change involved periods not previously scheduled or report types not previously enabled.

Connections with high usage

To report connections with excessive CCS, two warning messages are provided.

- TFS401 is printed when the CCS is greater than or equal to 36 CCS, but less than 50 CCS.
- TFS402 is printed for CCS greater than or equal to 50.

When a network path is held for longer than one hour (36 CCS), the accumulated usage can have a detrimental effect on hourly traffic studies. High-usage connections can result from the following:

- data terminal connections
- loop start trunks that fail to provide suitable supervision
- long conversations
- call processing faults
- telephone problems

Small quantities

Peg counts and usage measurements for a small number of calls should not be used to analyze traffic data. Traffic measurements are not accurate for small samples.

Traffic information is accumulated in units of 2 seconds and is converted to CCS when printed. The CCS amounts are rounded to the nearest thousandth, so usage of less than 50 CCS is printed as 0 CCS.

Matching timeslots

Switching is accomplished through network groups and loops.

- A half-network group contains 16 network loops.
- A full-network group contains 32 network loops.
- A network loop has 32 timeslots.
  - 30 are used to establish a network connection
  - 1 is for signaling and control
  - 1 is reserved for future use

A timeslot is considered busy if it is in actual use or is reserved by the Central Processing Unit (CPU) for future use.

In systems with standard (non-enhanced) loops, timeslots are used in matching pairs so that each timeslot can be used with only one other timeslot on the same or different network loop. Thus, a matching pair of timeslots is idle only if both timeslots are idle. For a network connection between different groups, the matching timeslots must be idle in at least one of the four junctors between the two network groups.

Systems with enhanced loops do not require matching timeslots. Any timeslot in the enhanced network loop can be used with any other timeslot (with the exception of 0 and 1).

Measurement verification

A number of cross-reference checks can verify the traffic data. Sometimes a path is reserved but never actually used, or is used but is neither a tone and digit loop connection, nor a part of a completed call under the definition of a TFC001 report, so the checks given here contain a tolerance. For example, with ring no answer, a path is reserved between the two terminals, but not used.

TFS001 and TFC001

In these cases, TFS001 usage accumulates as the timeslots involved are considered occupied; however, no usage accumulates in either TFC001 or TFS002 reports.

The sum of TFS001 usages on all terminal loops, minus the sum of TFS001 usages on tone and digit loops should equal twice the sum of all TFC001 usages for all customers ±25 percent.

TFC001 and TFC002

For each customer the following figures should be within ±2 percent:

- Outgoing usage plus tandem usage in TFC001 should equal the outgoing trunk usages for all groups in TFC002.
- Outgoing peg count plus tandem peg count in TFC001 should equal the sum of all outgoing trunk peg counts, less Recorded Announcement Trunk peg counts, for all groups in TFC002.
- Incoming usage plus tandem usage in TFC001 should equal the sum of all incoming trunk usages for all groups in TFC002.
- Incoming peg count plus tandem peg count in TFC001 should equal the sum of all incoming trunk peg counts for all groups in TFC002.

TFS001 and TFS002

The following figures should be within ±15 percent:

- The sum of loop failure to match over all Tone and Digit Switch (TDS) loops in TFS001 should equal the sum of failure to match over all services except Digitone Receiver and conference loops in TFS002.
- The sum of loop usage over all TDS loops in TFS001 should equal the sum of service usage over all services except Digitone Receiver and conference in TFS002.
- The sum of loop peg count over all TDS loops in TFS001 should equal the sum of service peg count over all services except Digitone receiver and conference in TFS002.

The following figures should be within ±2 percent:

- The sum of loop failure to match over all conference loops in TFS001 should equal the conference failure to match in TFS002.
- The sum of loop usage over all conference loops in TFS001 should equal the conference service usage in TFS002.
- The sum of loop peg count over all conference loops in TFS001 should equal the conference service peg count in TFS002.

System traffic reports

Contents

This section contains information on the following topics:

Introduction

This section describes the system traffic measurements and reports. Peg count and thresholds are always given as a five-digit number. Usage (accumulated CCS) and console measurements are given as seven-digit numbers.

TFS000 traffic print program entry

TFS000 is output to indicate the start of the reports.

TFS001 networks

The TFS001 report measures four types of network loops, which appear on the report as the following:

- TERM (lines, trunks, and consoles)
- TDS (Tone and Digit Switch)
- MFS (Multifrequency Sender)
- CONF (Conference service)

Six columns of data indicate intraloop and loop measurements. The first three measurements, which show intraloop data, are valid only for terminal loops. TDS, MFS, and CONF loop values are always zero as they do not use intraloop measurements. The six columns are as follows:

- FTM (failure to match) increments when an intraloop connection cannot be made because all timeslots are busy.
- CCS shows the total time (in hundreds of call seconds) that two timeslots are busy in the same loop.
- PC (peg count) increments when an intraloop connection becomes idle.
- Loop FTM increments for the total loop when a connection between two terminals cannot be made.
- Loop CCS shows the total time that timeslots were busy for a loop.
- Loop PC indicates the total number of times that a connection was idled for the loop.

TFS001 may count incomplete or unsuccessful calls as well as successful ones. TFS001 does not count calls that use End-to-End Signaling (EES). The sections on "Terminal loop measurements" on page 32, "Conference loop measurements" on page 34, and "Service loops" on page 36 describe this information in greater detail. See Table 2 on page 37 for the TFS001 report format.

Intraloop and loop FTM should be zeros. Any failure to match indicates a load balance problem. The call seconds should not exceed 3500, and all terminal loops should have similar CCS counts (within 100 CCS of one another). Total loop blockage should be less than 1 percent; although, blockage on an individual loop may exceed 1 percent.

To solve blockage and load problems, redistribute terminals and CCS over loops. Overloaded loops should not get new traffic, and it may be desirable to add a shelf or a loop (if the average loop CCS exceeds 660).

Terminal loop measurements

This section gives a detailed description of each field in each report.

Loop number

The loop number that is being measured.

Loop type

The type of network being measured (Phantom loop, terminal loop, TDS or MFS Sender loop, or conference loop).

Intraloop failure to match (FTM)

When two terminals on the same loop fail to match, loop FTM increments twice (once for each terminal) and intraloop FTM increments once. Intraloop FTMs indicate whether blockage occurred on a single loop or among many loops. Lessening traffic can ease most intraloop and interloop FTMs.

For Digital Trunk Interface (DTI) loops, the FTM increments only once.

Intraloop usage

When two points on the same loop connect, call usage is added twice to loop usage (once per timeslot) and once to the intraloop usage.

Intraloop peg count

If two connection points on the same network loop are idled, the loop peg count increments twice, once for each terminal, and the intraloop peg count increments once. These measurements plus the interloop measurements show the actual system loop usage.

Loop FTM

The loop FTM increments when the following conditions occur:

- A terminal to terminal connection is blocked. In this case, the loop FTM of both network loops increments.
- A terminal or Digitone Receiver (DTR) to service loop path is blocked. An FTM is counted on both the service loop and the terminal loop. No call can generate more than two FTMs.
- A single-line telephone to DTR path is blocked. An FTM is counted on both the DTR loop and the terminal loop. For any one call, at most one pair of FTMs per blocked idle DTR can occur. After the first pass at all DTRs, further attempts to find an idle DTR and a path to it (the system tries again automatically) are not counted as additional loop FTMs.
- A terminal loop to conference loop connection is blocked when any party tries to form a new conference or to add a new conferee to an existing conference.

Loop usage

The loop usage gives the total time that loop timeslots were busy. This measurement reflects the switch condition.

- Switches with less than 200 to 300 CCS on enhanced network loops (QPC414) or 800 to 900 CCS on superloops are considered low-usage switches.
- Average use ranges from 300 to 500 CCS for enhanced network loops (QPC414) and from 1200 to 2000 CCS for superloops.
- High-usage switches have 500 to 600 CCS on enhanced network loops (QPC414) and 2000 to 2800 CCS on superloops.

The maximum supported loop CCS for local equipment is 660 for network loops (QPC414) and 3500 for superloops (NT8D04).

A report whose loop CCS is greater than 1080 CCS for network loops or 4320 CCS for superloops is invalid.

Loop peg count

This measurement increments when an established path between two terminals becomes idle. Idling the paths between the terminals and DTMF or DTR loops does not increase the terminal loop peg count. Idling the paths does accumulate peg counts on the service loops.

Conference loop measurements

Other measurements apply to conference calls.

Intraloop peg count, usage, and FTM

Since all calls to a conference loop are from another loop, the intraloop measurements are always zero.

Loop FTM

The conference loop FTM increments in two cases:

- No conference loop is available for a new conference. In this case, all conference loops of the system have been checked, and the FTM counts against the last conference loop checked. Conference loops are not used in any order so the last one checked is not always the same.
- A new conferee cannot be added to an existing conference.

Loop usage

This measurement gives the total time that timeslots in this loop were marked as busy and unavailable for other use. Conference loop usage can vary greatly. Conference loops are selected randomly and are evenly distributed throughout the system.

Loop peg count

This shows the total number of people involved on a given conference loop. The loop peg count increments when an established path between the connection point and the conference loop is idle. The connection point's loop peg count is not incremented. Each person involved in the conference requires a path between the telephone and the conference loop.

When a conferee leaves a conference, a peg is made only on the conference loop. The overall effect is:

- one peg per added conferee on its terminal loop
- one peg per conferee, including the controller, on the conference loop
- one peg per added conferee on the controller's terminal loop

For example, a six-party conference gives five pegs on the terminal loop peg count, six on the conference loop, and five on the controller's terminal loop.

End-to-End Signaling Interworking does not use the conference loop, reducing traffic measurement on this loop.

Service loops

Service loops include TDS and MF senders.

Since all calls to a service loop are from another loop, the intraloop measurements are always zero.

Loop FTM

When you cannot find a path for either a tone or an outpulsing to a terminal loop or service loop, then loop FTM counts on the last service loop checked. Further attempts to provide the service to the same terminal are not counted.

Within a given network group, service loops are checked in a fixed order. In normal operation, switches on the first TDS loop, which accumulates the peg and usage traffic, show high usage and those on a second loop that accumulates all loop FTM counts show low usage.

Loop usage

Loop usage gives the total time that timeslots of this loop are marked busy and unavailable for other use.

Loop peg count

This count increments whenever a path to the TDS loop becomes idle.

Table 2 shows the format and an example of the TFS001 network report.

Table 2
TFS001 networks report format

Format							
System ID	TFS001						
Loop number	Loop type	Intraloop FTM	Intraloop CCS	Intraloop peg count	Total loop FTM	Total loop CCS	Total loop peg count
Example							
200	TFS001						
004	TERM	00000	0000142	00161	00001	0002056	01652 S
008	TERM	00000	0000184	00180	00001	0002500	01725 S
012	TDMS	00000	0000000	00000	00013	0000031	01496
013	CONF	00000	0000000	00000	00000	0000010	00006
014	TERM	00000	0000085	00060	00006	0000544	00287
015	TERM	00003	0000064	00039	00014	0000372	00284

Note 1: Superloops are identified by an “S” at the end of the line. Superloop numbers exist in multiples of four (4, 8, 12, 16, and so on). For example, if superloop 4 exists, loops 5, 6, and 7 do not.

Note 2: One way to determine the grade of service provided within the listed loop, is as follows: divide the FTM by the total loop peg count + FTM and multiply by 100%.

TFS002 service loops

The TFS002 report measures the following service loops: CONF, DTR, TDS, MFS, and tone detectors. The report output differs according to the type of service. Each type of service has its own report line.

Three-digit numbers identify each service:

000 Dial Tone
001 Busy Tone
002 Overflow Tone
003 Ringback Tone
004 Tone Ringing Digital Telephones
005 Miscellaneous Tone
006 Outpulsers
007 Spare
008 Digitone Receiver
009 Conference
010 MF Tone for Automatic Number Identification (ANI)
011 System Tone Detector
012 Multi-Frequency Compelled (MFC) Trunk Signaling
013 SOCOTEL Multi-Frequency Signaling
014 Dial Tone Detection
015 Multi-Frequency Receiver
016 EES TDS usage
017 EES conference usage
018 MFK5, Spanish KD3 Signaling
019 MFK6, Spanish KD3 Signaling

See Table 3 on page 41 for the TFS002 report format.

Service failure to match (FTM)

When no path can be found between a terminal and any service loop, the FTM for that service increments. Repeated attempts to obtain a path for a service (dial tone, overflow tone, or outpulse) count as a single service FTM.

The response to the FTM varies, depending on the type of request:

- A queue forms for requests for Digitone Receivers, dial tone, overflow tone, and outpulsing connections. The system periodically searches for a network path.
- The system abandons requests for tones other than dial tone and overflow tone.
- Conference connections are replaced by overflow tone; console tone and the buzzing tone are not provided by the TDS.

Service usage

Service usage indicates the total time that the path to the service loop was busy. Peg counts for dial tone, busy tone, overflow tone, ringback tone, ringing tone, and miscellaneous tone appear per timeslot, not per call. Outpulsers accumulate usage for the duration of time spent outpulsing. The trunk circuit card, rather than the TDS card, performs the actual outpulsing.

Service request peg count

This measurement increments whenever a path between a terminal and a service loop becomes idle. The report identifies the service with a three-digit number. If the type of service is unknown, the miscellaneous tone peg count increments.

An outpulse is pegged once for the duration of outpulsing. Each outpulsed digit is not counted.

Conference measurements

TFS002 service number 9 represents the sum of all conference measurements on a per conferee basis. For example, a three-party conference for 200 seconds counts three times with usage equal to 6 CCS.

Digitone Receiver (DTR) measurements

DTR measurements reflect service failures, usage, and requests.

Service FTM

This count increments when the system cannot find a path between the originating party and an idle DTR. It does not increment in the case where idle DTRs cannot be used because of network blocking, and a subsequent idle DTR is successfully used for the call.

If the system cannot provide dial tone through a DTR, but the path between the originating party and the DTR is available, the DTR FTM increments. When the system makes repeated attempts to find a path to an idle receiver, any attempt after the first does not increment the FTM.

Service usage

This gives the time that the path between the DTR and the originating party was busy. It accumulates when that path is made idle.

Service request peg count

This count, which shows the number of DTR uses, increments when a path between a DTR and a single-line telephone, or a direct inward dial (DID) or tie trunk (receiving DTMF from the central office) is idle. The systems do not provide dial tone to 2500-type telephones until an idle DTR and network path are available. Since requests for dial tone are queued if the TDS is not available, the count reflects the number of unavailable TDS timeslots as well as DTR use. The following formula determines grade of service:

FTM / (peg count + FTM)

Tone detector service

Tone detector statistics indicate service failures, usage, and requests.

Service FTM

This count increments when no path is available between an idle tone detector and a trunk.

Service usage

This count increments when the path between the tone detector and the originator is busy.

Service request peg count

This count increments when the path between the tone detector and the trunk is idled. The count reflects the total number of times the tone detectors are used.

Table 3 shows the format and an example of the TFS002 service loops report.

Table 3
TFS002 service loops report format (Part 1 of 2)

Format			
System ID Service number	TFS002 Service FTM	Service usage	Service request peg count
Example			
200	TFS002		
000	00002	0000023	01650
001	00000	0000003	00099
002	00002	0000008	00321
003	00002	0000057	00951
004	00000	0000010	00168
005	00000	0000005	00068
006	00003	0000044	00376
007	00000	0000000	00000

Table 3
TFS002 service loops report format (Part 2 of 2)

008	00013	0000076	01471
009	00000	0000013	00069
010	00000	0000002	00012
011	00000	0000000	00000
012	00000	0000002	00022
013	00000	0000001	00003
014	00000	0000000	00000
015	00000	0000000	00000
016	00000	0000000	00000
017	00000	0000000	00000
018	00000	0000000	00000
019	00000	0000000	00000

TFS003 dial tone delay

TFS003 measurements show the number of times users waited for dial tone for longer than 1 second. The report has three columns that indicate the following:

- the number of times a user waited longer than 1 seconds for a dial tone
- the number of times a user waited longer than 10 seconds for a dial tone
- the total delay time in seconds of all calls that waited longer than 1 second

Dial tone delay should occur in no more than 1.5 percent of calls. See Table 4 on page 43 for the TFS003 report format.

These counts include both successful and aborted connections. A call that is delayed for longer than 10 seconds increments both the 3-second and the 10-second counters. Dial tone delay can be caused by insufficient DTRs, network blockage, heavy CPU demands, or hardware faults.

Table 4 shows the format and an example of the TFS003 dial tone delay report.

Table 4
TFS003 dial tone delay report format

Format System ID Delay > 3 seconds	 TFS003 Delay > 10 seconds	 Total delays < or = 1 second
Example 200 00003	 TFS003 00001	 0040

TFS004 processor load

The processor load report indicates the load on the system by showing the peg count for CPU functions:

- idle cycle count (ICC)
- total CPU attempts (CA)
- load peak peg
- input/output buffer overflow
- call register overflow

Refer to Table 5 on page 51 for TFS004 report format.

The more real-time the switch uses, the slower call processing functions operate. For this reason, it is a good idea to check this report regularly (twice a year or whenever new features are added) to ensure the system is not overloaded. The idle cycle count should be a minimum of 1 million cycles.

Parameters applicable to all releases

Reported measurements

- idle cycle count
- CPU attempts
- load peak peg count
- high priority input buffer (HPIB) overflow peg count
- low priority input buffer (LPIB) overflow peg count
- analog (500/2500-type) output buffer (OB) overflow peg count
- SL-1 OB overflow peg count
- CR overflow peg count

Idle cycle count

The idle cycle count provides a measure of the real-time capacity used for call processing. If no higher priority call processing or I/O activity requires attention, the idle cycle count is incremented.

As the load increases, the idle cycle count decreases. As the load decreases, the idle cycle count increases.

The higher priority tasks include:

- input messages (including timing marks)
- 128 ms timing tasks (high-priority or low-priority)
- ring/queue activity
- teletype (TTY) input

Total CPU call attempts

This increments once for each of the following:

- dial tone request
- incoming trunk seizure
- call originating from the attendant
- attempt by the attendant to extend a call

Load peak peg

The load peak peg count is the number of times the CPU could not process a high priority task within 128 ms. The CPU continues to perform and complete the tasks, in order of priority, until all the tasks are completed.

I/O buffer overloads

I/O buffer overload measures the number of times that signaling or output signals have been lost due to buffer overflow. Each peg count indicates a lost call. The buffers involved are the:

- high-priority input buffers
- low-priority input buffers
- analog (500/2500-type) telephones output buffers

If any I/O buffer overflow count is not zero, it indicates an extreme traffic load, a hardware fault, or the given buffer is not being fully used. Refer to *Large System: Planning and Engineering* (553-3021-120) for recommended buffer sizes.

Call register (CR) overflow

Call register overflow counts the number of times call processing software fails to find an idle call register. Each peg represents either a lost Call Detail Recording (CDR) record, a lost call, or an uncompleted feature. When a call or feature requires a call register and none is available, a call register transfers from the CDR queue to the call or feature. In this way, calls and features are given higher priority than CDR records. Refer to *Large System: Planning and Engineering* (553-3021-120) for call register provisioning guidelines.

Call capacity related parameters

Reported measurements

- rated call capacity of the system
- percentage of call capacity used for the current hour
- maximum percentage of call capacity used during the sampled period
- day (day of the month) and hour of the maximum percentage call capacity usage during the sampled period
- number of eliminated measurements during the sampled period

Let the switch be running for N hours after the most recent sysload or initialization. Also, let the sampled period be W hours. W is the minimum of N and 168, where 168 is the number of hours in a week. The sample period is typically one week or 168 hours. Measurements are stored and analyzed over the most recent W hours.

An observation (that is, the ICC value and its corresponding CA value) is recorded once an hour. Depending on which of the four frequency options have been selected, this observation is taken on the half hour or the hour. The correspondence is as follows:

option “0” - TFS004 never printed : observation on the hour

option “1” - TFS004 hourly on the hour : observation on the hour

option “2” - TFS004 hourly on the 1/2 hour : observation on the 1/2 hour

option “3” - TFS004 half-hourly : observation on the hour

Note: For option "3", there are two TFS004 reports for only one observation. In this case, the regression and observation fields on the 1/2 hour report show exactly the same values as were shown in the previous report, which occurred on the hour. These describe activity during the previous hour-to-hour. The most recent half-hour's observation and regression data will not be shown until the next report, at the top of this hour, which shows the current half-hour and the upcoming one combined. The other fields in the TFS004 report that are not related to regression computation – the peak, overflow, and blocked calls pegs – are still updated half-hourly and so refer only to the previous half-hour. Nortel Networks recommends that the user schedule hourly rather than half-hourly reporting if the user's interest is exclusively regression results.

After a sysload or initialization, asterisks are printed for the first 23 hours because of insufficient data collection. That is, if the value of N is less than 24, asterisks are printed in the above five fields of the TFS004 output. Analysis is performed after 24 hours of data collection.

Linear regression line analysis is used in the computation, assuming that (ICC, CA) pairs for different hours of the data window lie approximately on a straight line.

Noisy points typically occur when the processor is performing non-call processing tasks including management, reporting, or midnight routines. The analysis eliminates noisy points up to *ceiling* (W/8) data points, where *ceiling* (x) is a mathematical function denoting the smallest integer not less than x. Therefore, if W is equal to 70, up to 9 data points can be eliminated. However, if W is equal to 168, up to 21 data points can be eliminated.

The algorithm outputs the value of Rated Call Capacity (RCC), only when certain constraints are met. The coefficient of determination is a measure of the goodness of fit of the data points to a straight line. Numerical results are printed when either of the following two conditions are met:

- coefficient of determination is larger than or equal to 0.75
- coefficient of determination is larger than or equal to 0.55 and the ratio CA/RCC is less than or equal to 0.1

If these conditions are not met, four asterisks ('****') are printed in the fields.

Rated Call Capacity

Rated Call Capacity (RCC), determined over the most recent W hours, is a function of the idle cycle count and the number of call attempts, for every hour. As mentioned earlier, W is the minimum of N and 168, and N is the number of hours since sysload or initialization. RCC represents the maximum level at which the CPU can operate and still maintain a high grade of service.

Valid RCC computations are performed for values of W greater than 23. That is, computations are performed when more than a days (24 hours) worth of data is available.

The RCC assumes 30% peakedness during busy hours. That is, the maximum traffic peak within the busy hour is 30% higher than the average traffic level for that hour. Slight RCC variations are normal.

Percent of Call Capacity Used

Percent of Call Capacity Used (Percent of CCU) is an indicator of the load level of the system for the current hour using the following formula:

Percent of CCU = 100 x Current number of call attempts / RCC

Maximum of Call Capacity Used

Maximum of Call Capacity Used (Max CCU) shows the maximum value of CCU during the previous W hours using the following formula:

Max CCU = Maximum value of CCU over the past W hours

Day and hour of Maximum Call Capacity Used

Day (day of the month) and hour of Maximum Call Capacity Used shows the day and hour at which the maximum value of CCU occurred, which is the busiest hour of the previous W hours. Its format is DDHH, where DD is the day of the month and HH is the hour.

For example, if the date of the traffic report is May 15, 1998 (which reports the past 7 days) and the hour of maximum CCU is 1214, then the heaviest call processing load was experienced on May 12 at 14:00 (or 2:00 p.m.). If the date of the traffic report is May 2, 1998 (which reports the past 7 days) and the hour or maximum CCU is 2711, then the heaviest call processing load occurred on April 27, 1998 at 11:00 a.m.

Exception peg count

Every measurement that contains information not related to call processing activity impairs the relationship between idle cycle counts and number of call attempts, reducing the accuracy of calculations. Exception peg count indicates the number of points not considered (eliminated) in the analysis. Its largest value is *ceiling* (W/8).

Line Load Control (LLC)

Line Load Control (LLC) is a manually activated feature associated with optional feature Package 105 that denies calls from designated stations. LLC can be set to:

- OFF – no LLC
- F – to block the first group of calls
- S – to block the first and second groups of calls
- T – to block the first, second, and third groups of calls

Blocked group members cannot originate internal or trunk calls.

LD 02 defines blocking probability for LLC levels. The TFS004 report prints the blocking counts only when optional feature package 105 is equipped.

Refer to *Features and Services* (553-3001-306) for more information on LLC level definition and activation.

Manual calculation of real-time load

This manual calculation should only be used if RCC and Percent of CCU are not available, since it is a less accurate approximation of the algorithm used to compute the Call Capacity Report values.

1 Collect TFS004 for a minimum of 12 hours.

2 Find the maximum idle cycle (IICC) and corresponding number of Idle Call Attempts (ICA) over the hour when the switch processes almost no calls (the most non-busy hour).

3 Find the minimum idle cycle (BICC) and corresponding number of Busy Call Attempts (BCA) during the busiest hour.

The RCC can be estimated using the following formula:

RCC = 0.7 x (BCA - BICC x (ICA - BCA) / (IICC - BICC))

Where the factor 0.7 accounts for the processing overhead of the system and the 30% peakedness which is assumed.

CCU and CCA parameters

The Percent of CCU corresponding to BCA can be determined using the following formula:

Percent of CCU = BCA / RCC x 100

If the Percent of CCU is less than 100%, the Percent of Call Capacity Available (CCA) can be determined using the following formula:

Percent of CCA = 100 - Percent of CCU

Note: The maximum idle cycle count is a function of the system configuration, software release, and package list. In case of software upgrades or changes to the hardware configuration, including additions of trunks or lines, the maximum idle cycle count should be recalculated. It is recommended that the maximum idle cycle count be recalculated for every traffic study.

Table 5 on page 51 shows the format and an example of the TFS004 processor load report.

Table 5
TFS004 processor load report format

Format		
System ID	TFS004	
Idle cycle count	CPU attempts	Load peak peg count
HPIB overflow peg count	LPIB overflow peg count	
500/2500 OB overflow peg count	SL-1 OB overflow peg count	
CR overflow peg count		
Rated Call Capacity (see Note)	Maximum CCU (Note)	% of CCU (see Note)
Number of eliminated observations (see Note)	Day of the month and hour of Max CCU (format: DDHH) (Note)	
LLC1 blocked calls	LLC2 blocked calls	LLC3 blocked calls
Example		
0377	TFS004	
020906195	03042	00000
00000	00000	
00000	00000	
00000		
16829	00023	00018
00001	1316	
00000	00000	00000

Note: Asterisks appear in these fields when the information is insufficient to generate the report.

Call Capacity Report Enhancement

The Call Capacity Report Enhancement (CCRE) feature improves the stability and accuracy of traffic reports. The enhancement includes:

- data collection is based on seven 24-hour days
- real-time calculation improvements

The Call Capacity Report Enhancement feature does not require user operation changes. Traffic reports contain the same number of fields in the same format as the current TFS004 report with the exception of a change to the field corresponding to the time of Maximum Call Capacity Used.

TFS005 measurement on selected terminals

The TFS005 measurements are output for individual Terminal Numbers (TNs) such as telephones, trunks, or both, within a terminal loop (see Table 6 on page 53). Assign the Individual Traffic Measurement (ITM) class of service to these TNs with the Traffic program (LD 02). These measurements can help analyze traffic by department or group.

The TFS005 report shows accumulated traffic for loop numbers. The report also shows the total CCS for terminals assigned an ITM COS and cumulative line peg count for each loop.

Line usage

This is the total usage for all calls in a loop for terminals set using ITM. View individual terminals to determine their usage. Totals are related to those in TFS001, although the correlation is imprecise.

Line peg count

When an established path involving a non-trunk terminal with ITM becomes idle, the line peg count increments for the terminal's loop. If both terminals in an established path have ITM, then two line peg counts are added. In addition, when an established path between a terminal and a conference loop becomes idle and the terminal has ITM, the line peg count increments for the terminal's loop.

For all trunks, the peg count increments when the trunk becomes idle if, at any time since the trunk was seized, it was involved in an established connection.

Table 6 shows the format and an example of the TFS005 lines report.

Table 6
TFS005 lines report format

Format		
System ID	TFS005	
Loop number	Line usage	Line peg count
Example		
200	TFS005	
00	0000144	00066
01	0000213	00179
02	0000232	00144
03	00000244	00130
05	00000289	00124
08	00000218	00158
10	00000229	00154

TFS007 junctor measurements

Each network group has two network shelves and 32 consecutively numbered loops. Junctors link network groups together. The TFS007 report displays measurements related to the paths that connect different network groups, involving an intergroup junctor. Measurements indicate the FTMs for each junctor, the junctor usage in CCS, and a peg count of network group connections.

An Option 81C CP PII system with Fiber Network Fabric (FNF) can have 8 non-blocking (inter-group) Network groups. This expansion increases the number of available loops from 160 to 256.

Each network group must be connected to all the other network groups. The two-digit junctor number that appears in the first column of the report signifies which two groups are connected:

- network group 0 contains loops 0 to 31
- network group 1 contains loops 32 to 63
- network group 2 contains loops 64 to 95
- network group 3 contains loops 96 to 127
- network group 4 contains loops 128 to 159
- network group 5 contains loops 160 to 191 (Large Multi Group systems)
- network group 6 contains loops 192 to 223 (Large Multi Group systems)
- network group 7 contains loops 224 to 255 (Large Multi Group systems)

For example, junctor 02 connects network group 0 (loops 0 to 31) and network group 2 (64 to 95).

Table 7 shows the format and an example of the TFS007 junctors.

Table 7
TFS007 junctors

Format			
System ID	TFS007		
Junctor group	Junctor FTM	Junctor usage	Junctor peg count
Example			
222	TFS007		
01	00001	0001642	01554
02	00001	0001696	01852
12	00002	0001712	01518

Junctor FTM

The junctor FTM counts the failures to establish a connection between network groups. The junctor FTM increments the peg count at the originating loop, the junctor group, and the terminating loop. Blockage in a junctor group should not exceed 1 percent. Determine junctor blockage with the following formula:

Junctor FTM / (junctor peg count + FTM) x100

Junctor usage

This measurement gives the total time in CCS that timeslots of the junctor group were busy and unavailable for other use. Low usage is approximately 500 CCS per group and high usage is approximately 1700 CCS. Two-group network systems usually have higher usage than larger systems because fewer connections are available.

If junctor loads are unbalanced, it may be desirable to redesign network groups. Departments with a high level of intercommunication should be in the same network group, separated on different loops. Outgoing trunks on a given route should be spread across groups. DTRs should also be spread across groups.

Junctor peg count

The junctor peg count shows completed calls between network groups. Connections to tone and digit loops do not affect the peg count. The junctor peg count increments when the connections between network groups become idle.

TFS008 Command Status Link and Application Module Link measurements

TFS008 gives traffic statistics related to Command Status Link (CSL) and Application Module Link (AML). The CSL handler tracks every incoming and outgoing message for each CSL message type. The counts appear on the traffic report and are kept by the CSL handler whether or not a traffic report is scheduled. The traffic report can be configured using LD 02 to appear every hour on the hour or half hour. Refer to Table 8 for the format and an example of the TFS008 report and also refer to page 58 for the TFS008 report legend.

Table 8
TFS008 CSL and AML measurements report format (Part 1 of 2)

Format											
System-ID	TFS008										
SYSTEM			iqsys ovlf	oqsys ovlf	syscr unavl	avgiq sys	avgiq call	avgiq admin			
CSL											
csl#	vasid	fails	link stop	down time	avgoq size	iochr ovfl	eobf miss	eobf prem	inval prior	inval lngth	
OMSG	cas uts calans icc dta	crs tnmn calds ias disreq	pci confm usm itc disres	ans data ceq init itrq	dis audit cab isis sfr	dnp cts ftr iei iacs	digit dsi mon icss idcs	tmg timstp iqs sfn iodn	tst query its conreq irqs	mwi ovd iss conres idsn	iumfs
IMSG	con opr calans cdd	incl gts calds conreq	rls tnmn setftr conres	offh alrm mon dta	rdy confm iqr disreq	nrdy data itr disres	msi audit isr iacr	msb rtsc isi idcr	conf timstp iei irqr	mwi query icsr iufmr	
PRI	pri1	pri2	pri3	pri4							
TRAF	aaaa	bbbb	cccc	dddd	eeee						
FLOW	ffff	gggg	hhhh	iiii	jjjj	kkkk					
PACKETS		output	input								

Table 8
TFS008 CSL and AML measurements report format (Part 2 of 2)

Example											
0111	TFS008										
SYSTEM			00004	00000	00003	00360	00001	00456			
CSL											
CSL01	00010	00021	00032	00043	00054	00001	00026	00089	0033	0022	
OMSG	00001	00002	00003	00004	00005	00006	00007	00008	00009	00010	
	00010	00014	00028	00040	00034	00025	00067	00016	00028	00001	
	00009	00157	00021	00000	00065	00000	00000	00000	00000	00000	
	00000	00000	00000	00099	00000	00000	00000	00000	00001	00000	
	00005	00000	00000	00086	00327	01843	00319	00000	00552	00000	00000
IMSG	00004	00003	00005	00006	00043	00002	00006	00009	00019	00007	
	00010	00014	00028	00040	00034	00025	00067	00016	00028	00001	
	00009	00157	00000	00000	00000	00000	00000	00000	00000	00000	
	00000	00000	00001	00005	00000	00000	01901	01700	00003	00000	
PRI		00632	00078	00400	00067						
TRAF	00000	00000	00000	00000	00000						
FLOW	00000	00000	00000	00000	00000	00000					
PACKETS		00020	00012								

Legend for TFS008 report

SYSTEM

iqsys ovfl	input queue overflow
oqsys ovfl	output queue overflow
syscr unavl	system resource not available
avgiq sys	average input queue size for system messages
avgiq call	average input queue size for call processing messages
avgiq admin	average input queue size for administration messages

CSL

csl#	Command Status Link (CSL) port number
vasid	value-added server ID associated with this link
fails	number of CSL output failures
link stop	number of times the link stopped
down time	link down time in seconds
avgoq size	average output queue size
iochr ovfl	number of times IOCHAR TTY buffer overflowed
eobf miss	number of packets with End of Block flag missing
eobf prem	number of packets with End of Block flag premature
inval prior	number of packets with invalid priority
inval lngth	number of packets with invalid length

OMSG/IMSG—outgoing/incoming message types

alrm	alarm indication
ans	call answered
audit	software audit
cab	call abandons queue
calans	call answer
calds	call disconnect
cas	channel assignment
cdd	control display digits
ceq	call enters queue
con	call connect
conf	conference request
confm	confirmation

conreq	network layer connect request
conres	network layer connect response
crs	call connection request
cts	change terminal status
data	administration data block
digit	dialed digits
dis	call disconnect
disreq	network layer disconnect request
disres	network layer disconnect response
dnp	DN update
dsi	device state information
dta	network layer data
ftr	
gts	get terminal status
iacr	acquire request
iacs	acquire response
ias	the number of statistics messages
icc	the number of incoming call indication messages
icsr	the number of check/change call detail recording (CDN) state requests
icss	the number of check/change call detail recording (CDN) state response messages
idcr	deacquire request
idcs	deacquire response
idsn	ATB on/off for acquire route
iei	the number of error indications sent (output messages [OMSG])
iei	the number of error indications (input messages [IMSG])
incl	incoming call accepted
init	the number of system initialization indication messages
iodn	acquired device removed
iqr	the number of queue requests
iqs	the number of queue request response messages
irqr	query request
irqs	query request response
isi	the number of start up/shut down indications

isis	the number of start up/shut down indication response messages
isr	the number of statistics requests
iss	the number of statistics response messages
itc	the number of treatment completed messages
itr	the number of treatment requests
itrq	return to queue
its	the number of treatment response messages
iumfr	update message Filter Bitmap request
iumfs	update message Filter Bitmap response
mon	monitor
msb	make set busy
msi	make set in service
mwi	message waiting indication change
nrdy	not ready
offh	off hook
opr	operator revert
ovd	override
pci	present call
query	query
rdy	ready
rls	call disconnect request
rtsc	request terminal status change
setftr	set feature message
sfn	set feature notification
sfr	set feature
timstp	timestamp
tmg	telset message
tnmn	TN maintenance mode
tst	telset status message
usm	unsolicited status message
uts	update terminal status

PRI	number of messages of priority 1 to 4 (excluding polling messages

TRAF	
aaaa	average MSDL AML incoming usage
bbbb	peak MSDL AML incoming usage
cccc	average MSDL AML outgoing usage
dddd	peak MSDL AML outgoing usage
eeee	time since last query traffic on MSDL card
FLOW	To prevent any application from tying up buffer resources due to its abnormal conditions or misbehavior, a flow control mechanism is defined in the system and at the card level. This flow control mechanism only applies to the normal interface (receive and transmit ring buffers, not the expedited interface). This flow control mechanism is based on a common "window" mechanism. The basic concept is that the number of outstanding messages that are associated with a Socket ID in the transmit or receive ring cannot exceed a predefined number, "application threshold". Note that the mechanism is based on the number of messages per application rather than the number of buffers per application.
ffff	first flow control hit starts a 128 ms timer to allow one more try
gggg	second flow control hit requests the sending of OK_TO_SEDN_REQ message using a logged SSD message to MSDL loadware. Start the 128 ms timer
hhhh	The third flow control hit asks the data socket to be resynchronized by MSDL loadware. Start the 128 ms timer.
iiii	fourth flow control hit starts a 128 ms timer such that the link is forced to disable after time out
jjjj	number of times outgoing ssd is lost or is not sent on time (MSDL only)
kkkk	number of times AML is reset (MSDL only)
PACKETS	number of incoming and outgoing packets

TFS009 D-channel

TFS009 reports traffic activity for D-channels. Eight fields report activity on the Multi-purpose Serial Data Link (MSDL) D-channel. Nine fields report activity associated with the QSIG Path Replacement feature.

The D-channel Expansion feature increases the total number of possible D-channels in a Multi Group system. The number of physical I/O addresses permitted for D-channel application is 16 for each network group. For each MSDL physical I/O address, up to four ports are available for D-channel use. With the D-channel Expansion feature, the software supports up to 255 D-channels.

For more information on the D-channel Expansion feature, refer to the *ISDN Primary Rate Interface: Features* (553-3001-369) and *ISDN Basic Rate Interface: Features* (553-3001-380).

See Table 9 on page 63 for the format of the TFS009 report and also refer to the TFS009 report legend on page 64.

Table 9
TFS009 D-channel report format

System ID DCH x		TFS009		
aaaa			nnnn	
bbbb			oooo	
cccc			pppp	
dddd			qqqq	
eeee			rrrr	
ffff			ssss	
gggg				
hhhh			tttt	
iiii				
jjjj			uuuu	
yyyy				
kkkk (MSDL only)			vvvv (MSDL only)	
llll (MSDL only)			wwww (MSDL only)	
mmmm (MSDL only)			xxxx (MSDL only)	
tat1 (MSDL only)			tat2 (MSDL only)	
DIV_NB		DIV_NEW	DIV_OLD	
CNG_NB		CNG_NEW	CNG_OLD	
CON_NB		CON_NEW	CON_OLD	
FLOW	FLOWa	FLOWb	FLOWc	FLOWd

Legend for TFS009 report

SYSTEM

aaaa	number of all incoming messages received on the D-channel
bbbb	number of all incoming call processing messages received on the D-channel
cccc	number of all incoming management messages received on the D-channel
dddd	number of all incoming maintenance messages received on the D-channel
eeee	average number of incoming bytes per message
ffff	accumulated real time a D-channel was busy transferring incoming messages in half-millisecond units (Divide the reported number by 2 for a result in milliseconds. For example: divide a reported number of 200 by 2 for a result of 100 milliseconds.)
gggg	running average of the number of requests queued in request output message buffer
hhhh	number of times when no request output message buffer was available
iiii	number of PRA layer-3 protocol errors since the last traffic report
jjjj	number of times the D-channel was down
yyyy	number of established call-independent connections
kkkk	average incoming link usage (given as a percentage of the link capacity)
llll	average outgoing link usage (given as a percentage of the link capacity)
mmmm	number of connected calls
nnnn	number of all outgoing messages sent on the D-channel
oooo	number of all outgoing call processing messages sent on the D-channel
pppp	number of all outgoing management messages sent on the D-channel
qqqq	number of all outgoing maintenance messages sent on the D-channel
rrrr	average number of outgoing bytes per message

ssss	accumulated real time a D-channel was busy transferring outgoing messages in half-millisecond units (Divide the reported number by 2 for a result in milliseconds. For example: divide a reported number of 200 by 2 for a result of 100 milliseconds.)
tat1	total number of anti-tromboning operations attempted since the D-channel traffic was last cleared Number of optimization requests with the diversion trigger
tttt	number of times a message with no End of Message (EOM) mark was received
uuuu	accumulated real time the D-channel was down since the last report in units of 2 seconds. For example, if the value is 10, the down time is 20 seconds
vvvv	peak incoming link usage (given as a percentage of the link capacity) over a 5-second period
wwww	peak outgoing link usage (given as a percentage of the link capacity) over a 5-second period
xxxx	time (in seconds) since the MSDL D-channel traffic was last cleared
tat2	total number of successful anti-tromboning operations since the D-channel traffic was last cleared
CNG_NB	Number of optimization requests with the congestion trigger
CNG_NEW	Number of optimization successful with the congestion trigger: a new path is used
CNG_OLD	Number of optimization successful with the congestion trigger but the old path has been retained
CON_NB	Number of optimization requests with the connected trigger
CON_NEW	Number of optimization successful with the connected number trigger: a new path is used
CON_OLD	Number of optimization successful with the connected number trigger but the old path has been retained
DIV_NB	Number of optimization requests with the diversion trigger
DIV_NEW	Number of optimization successful with the diversion trigger: a new path is used

DIV_OLD	Number of optimization successful with the diversion trigger but the old path has been retained
FLOW	To prevent any application from tying up buffer resources due to its abnormal conditions or misbehavior, a flow control mechanism is defined in the system and at the card level. This flow control mechanism only applies to the normal interface (receive and transmit ring buffers, not the expedited interface). This flow control mechanism is based on a common “window” mechanism. The basic concept is that the number of outstanding messages that are associated with a Socket ID in the transmit or receive ring cannot exceed a predefined number, “application threshold”. Note that the mechanism is based on the number of messages per application rather than the number of buffers per application.
FLOWa	first flow control hit starts a 128ms timer to allow one more try
FLOWb	second flow control hit requests the sending of OK_TO_SEDN_REQ message using a logged SSD message to MSDL loadware. Start the 128ms timer.
FLOWc	third flow control hit asks the data socket to be resynchronized by MSDL loadware. Start the 128ms timer.
FLOWd	fourth flow control hit starts a 128ms timer such that the link is forced to disable after time out.

TFS010 ISDN GF Transport

The GF/SS (Generic Functional protocol/Supplementary Service) call register overflow counts the number of times supplementary services or the ISDN transport are not able to find an idle call register. This peg count provides information to the field engineer for determining whether the number of call registers configured for the system needs to be increased.

Table 10 shows the format and an example of the TFS010 report.

Table 10
TFS010 ISDN GF Transport report format

Format System ID GF/SS call register overflow peg count	 TFS010
Example 200 00000	 TFS010

TFS011 Multi-purpose ISDN Signaling Processor traffic

The Multi-purpose ISDN Signaling Processor (MISP) card is used for ISDN Basic Rate Interface (BRI) activities. The MISP traffic report shows the call processing activities of all Digital Subscriber Loops (DSLs) associated with each MISP in the system and indicates the type of BRI traffic such as voice, data, or packet data.

This report contains Basic Rate Signaling Concentrator (BRSC) information, if the MISP serves BRSCs. It contains the following types of information for each MISP in the system. MISP information in the four D-channel parameters shows totals for the line cards that the MISP serves directly. BRSC information shows D-channel traffic data collected at the BRSC.

Table 11 shows the format and an example of the TFS011 report.

Table 11
TFS011 Multi-purpose ISDN Signaling Processor traffic report format (Part 1 of 2)

Format						
System ID TFS011						
MISP and BRSC ID						
Attempted calls	Completed calls	Call length	MISP/ BRSC messages	Terminal messages for MISP/ BRSC	MISP/ BRSC data packets	Terminal data packets for MISP/ BRSC

Table 11
TFS011 Multi-purpose ISDN Signaling Processor traffic report format (Part 2 of 2)

Example						
0111 TFS011						
MISP002						
00020	00006	00019	00080	00040	00000	00006
MISP004						
00030	00001	00030	00125	00060	00180	00012
BRSC						
24 0 15			005110	001020	003600	000200

Attempted calls (MISP only)

Number of attempted calls, including all successfully completed calls and incomplete attempted calls.

Completed calls (MISP only)

Number of successfully completed calls for the reported period.

Call length (MISP only)

Average length of a successfully completed call in seconds.

MISP/BRSC messages

Number of signaling messages sent by the MISP, the BRSC, or both to the terminals on the D-channels.

Terminal messages

Number of signaling messages sent by the terminals to the MISP, the BRSC, or both on the D-channels.

MISP/BRSC data packets

Number of D-channel data packets sent by the MISP, the BRSC, or both to the terminals.

If the MISP is configured with BRSCs, a separate report prints for each BRSC.

Terminal data packets

Number of D-channel data packets sent by the terminals to the MISP, the BRSC, or both.

In the sample report in Table 11 on page 68, MISP004 serves a BRSC.

TFS012 Multi-purpose ISDN Signaling Processor D-channel

The Multi-purpose ISDN Signaling Processor (MISP) card is used for ISDN Basic Rate Interface (BRI) activities. The MISP D-channel management messages check for communication problems between the MISP and the terminals. The report contains the traffic management activity for each DSL based on the exchange of signaling messages between the MISP and the terminals over the D-channels.

This report contains MISP and BRSC information for MISPs that serve BRSCs. In TFS012, the report indicates the total for line cards that the MISP serves directly. BRSC information shows D-channel data collected at the BRSC.

Table 12 on page 71 shows the format and an example of the TFS012 report.

Table 12
TFS Multi-purpose ISDN Signaling Processor D-channel report format

Format					
System ID TFS012					
MISP/ BRSC ID					
MISP/ BRSC links	Terminal links	MISP/ BRSC messages	Terminal messages	Incomplete calls	Link errors
Example					
0111 TFS012					
MISP	002				
00010	00015	00010	00016	00011	00002
MISP	004				
00001	00008	00016	00009	00017	00001
BRSC	24 0 15				
000004	000012	000021	000089	000061	00021

MISP/BRSC links

Number of MISP/BRSC-initiated link initializations.

Terminal links

Number of terminal-initiated link initializations.

MISP/BRSC messages

Number of management messages sent from the MISP, the BRSC, or both to terminals.

Terminal messages

Number of management messages sent from terminals to the MISP, the BRSC, or both.

Incomplete calls

Number of times the links associated with D-channels were not able to complete calls.

Link errors

Number of management data link errors.

If the MISP is configured with BRSCs, a separate report prints for each BRSC.

Table 13 on page 73 shows an MISP004 serving a BRSC.

TFS013 Multi-purpose ISDN Signaling Processor messages

The Multi-purpose ISDN Signaling Processor (MISP) card is used for ISDN Basic Rate Interface (BRI) activities. The MISP messages report shows the total number of call processing, maintenance, and management messages sent through each MISP in the system grouped by message size. Maintenance technicians analyze these totals to determine if messages are within the specified lengths.

This report includes BRSC information for MISPs that serve BRSCs. The MISP information shows totals for the line cards that the MISP serves directly. BRSC data reflects D-channel information collected at the BRSC.

The report has three columns, as defined below:

- **1–10 bytes** - Total number of messages from 1 to 10 bytes long.
- **11–20 bytes** -Total number of messages from 11 to 20 bytes long.
- **Greater than 20** - Total number of messages more than 20 bytes long.

A sample report appears in Table 13 on page 73. If the MISP is configured with BRSCs, a separate report prints for each BRSC.

Table 13
TFS013 Multi-purpose ISDN Signaling Processor Messages report format

Format		
System ID TFS013		
MISP/BRSC ID		
1–10 bytes	11–20 bytes	> 20
Example		
0111 TFS013		
MISP: 002		
00060	00000	00000
MISP: 004		
00012	00004	00000
BRSC: 024 0 15		
00004	00002	00000

TFS014 ISDN BRI trunk DSL system report

The ISDN BRI trunk DSL system traffic report (TFS014), dedicated to ISDN BRI trunk DSLs, provides traffic measurement similar to the one provided by the ISDN PRI system traffic report. The report contains the following information for each MISP in the system.

Table 14 shows the format of the TFS014 report.

Table 14
TFS014 ISDN BRI trunk DSL report format

Format	
System ID	TFS014
MISP ID	
Total number of outgoing maintenance messages	Total number of incoming maintenance messages
Total number of outgoing administration messages	Total number of incoming administration messages
Total number of outgoing protocol messages	
Total number of Layer 3 protocol messages	
Total number of Layer 2 protocol messages	
Total number of Layer 1 protocol errors	
Total number of connected calls	

TFS015 Meridian Packet Handler traffic report

The Meridian Packet Handler (MPH) report provides specific information about incoming and outgoing calls and data packets. This report is particularly useful for analyzing the flow of data over network links.

The report has ten columns as described in Table 15.

Table 15
TFS016 output

Column	Description
aa	The loop number of the Meridian Packet Handler.
bb	The link interface type (MCU, PRI, BCH, BRIL, BRSC); up to four characters. (To determine which link interface type is listed in bb, STAT the interface using STIF command in LD 32 (Network and Peripheral Equipment Diagnostic). The interface and timeslot appear.)
cc	The timeslot number of the link on the MPH loop; four digits.
dd	Number of initializations of layer 2 link(s); up to five digits.
ee	Number of attempted incoming calls; up to five digits.
ff	Number of completed incoming calls; up to five digits.
gg	Number of attempted outgoing calls; up to five digits.
hh	Average length in seconds of a data call; up to five digits.
ii	Number of incoming data packets; up to ten digits.
jj	Number of outgoing data packets; up to ten digits.

A sample report is shown in Table 16 on page 76.

Note: The exact field sizes could not be reproduced. In the actual report, the ii and jj columns wrap to the second line.

Table 16
TFS015 Meridian Packet Handler report format

Format									
System ID	TFS015								
aa	bb	cc	dd	ee	ff	gg	hh	ii	jj
Example									
0111	TFS015								
MPH002									
MCU	0006	0019	00040	00040	00006	00001	00360	00780	00568

TFS016 QoS IP statistics report

The QoS IP statistics report (TFS016) in LD 2 is created on the system to print Internet Telephone data at the zone level. The data is printed for the following categories at the end of each collection period on a per-zone basis and the counters are reset after the data is printed:

- Total inter/intra calls made
- Total inter/intra calls blocked
- Percent average inter/intra zone bandwidth used
- Percent maximum inter/intra zone bandwidth used
- Total inter/intra zone bandwidth threshold exceeded count
- Total packet loss, latency, and jitter (QoS thresholds)

Note 1: The "Total inter/intra zone bandwidth threshold exceeded count" prints the number of times a user-configured bandwidth threshold was exceeded for the zone during the collection period.

Note 2: TFS016 reports the number of times the "QoS thresholds" have been exceeded in a zone by the Voice Gateway (VGW) and the IP telephones that belong to that zone.

Table 17 shows the format and an example of the TFS016 report.

Table 17
TFS016 QoS IP statistics report format

Format													
System ID	TFS016												
zone	cmi	cmo	cbi	cbo	pi	po	ai	ao	vi	vo	pkl	lat	jit
Example													
0111	TFS016												
000	00005	00003	00000	00000	07	03	02	01	000	000	000	000	000
001	00003	00003	00000	00000	03	02	01	01	000	000	000	000	000

Table 18 describes the output data for the traffic report.

Table 18
TFS016 output

Column	Description
zone	number of the zone
cmi	intrazone calls made
cmo	interzone calls made
cbi	intrazone calls blocked
cbo	interzone calls blocked
pi	intrazone peak bandwidth (%)
po	interzone peak bandwidth (%)
ai	intrazone average bandwidth usage (%)
ao	interzone average bandwidth usage (%)
vi	intrazone threshold violations
vo	interzone threshold violations
pkl	packet loss violations
lat	latency violations
jit	jitter violations

TFS101 dial tone speed threshold

The dial tone speed threshold indicates the maximum acceptable percentage (in units of 0.1 percent) of calls with dial tone delay longer than 3 seconds. The report compares this threshold figure to the actual percentage of calls with dial tone delay. It is also output when a threshold violation occurs on TFS002.

Table 19 shows the format and an example of the TFS101 report.

Table 19
TFS101 dial tone speed threshold violation report format

Format	
System ID	TFS101
Percent dial tone delay	Threshold
Example	
200	TFS101
00017	00015

TFS102 loop traffic threshold

This threshold, which applies to all loops, shows loop usage in CCS per measurement period. Also output when a threshold violation occurs is a TFS001 report for all loops.

Table 20 on page 80 shows the format and an example of the TFS102 report.

Table 20
TFS102 loop traffic threshold violation report format

Format		
System ID	TFS102	
Loop number	Loop usage	Threshold
Example		
220	TFS102	
01	0000550	00450

TFS103 junctor traffic threshold

This threshold, expressed in CCS, highlights junctor usage per measurement period. When the junctor traffic threshold is exceeded, the TFS007 junctor traffic report prints. The threshold is the same for all junctor groups and cannot be set for each junction group individually.

Table 21 shows the format and an example of the TFS103 report.

Table 21
TFS103 junctor traffic violation report format

Format		
System ID	TFS105	
Junctor group	Junctor usage	Threshold
Example		
222	TFS105	
13	0002341	0002000

TFS301 initialization

A TFS301 message precedes traffic data output after an initialization. This message warns that some traffic data has been lost due to the initialization, and that the report is incomplete.

TFS302 traffic schedule changed

A TFS302 message warns that the traffic schedule was changed during the interval covered by the traffic report. Traffic report data may be invalid if the change covered dates or hours not previously scheduled or options not previously set.

TFS303 traffic measured over one hour

A TFS303 message indicates that traffic report data accumulated for more than one hour and is therefore inaccurate. For example, if reporting is scheduled to stop at 18:00 and restart at 08:00, the 08:00 report contains all data between 18:00 and 08:00 (14 hours). For an accurate report of the 08:00 to 09:00 hour, schedule reports to begin at 7:00.

TFS401 36 CCS terminals

A TFS401 message, which prints when a call disconnects, identifies connections held for more than 36 CCS but fewer than 50 CCS (between approximately 60 and 83 minutes). Although the regular traffic data measurements include the traffic data for these lengthy connections, a data analyst may decide that these calls represent abnormal usage and choose to exclude the data from statistical calculations.

TFS402 50 CCS terminals

A TFS402 message identifies connections, including data connections, that were held for 50 CCS or longer. The traffic data for these connections is not included in regular traffic measurements (pegs and usage). If network blockage occurs even though usage does not exceed recommended maximum CCS, long calls may trigger the TFS402 message. Be sure that terminals used for long connections are evenly distributed on your network loops. If no apparent reason for the message exists, the problem may be faulty hardware.

Table 22 shows the format and an example of the TFS402 report.

Table 22
TFS402 message output format

Format				
TFS402	CCS	TN1	TN2	TYPE
Example				
TFS402	64	002 01 09 10	039 07 05 01	11

Legend

CCS gives the connection usage in CCS.

TN1 and TN2 identify the terminal numbers. TFS001, TFS002, TFS005, TFS007, TFC001, and TFC002 figures can be adjusted for previous hours for the loops involved.

TYPE identifies how the network path was used.

0 dial tone
1 busy tone
2 overflow tone
3 ringback tone
4 tone ringing
5 miscellaneous tones
6 outpulsing
7 unknown use of a TDS
8 Digitone receiver
9 incoming trunk speech path
10 outgoing trunk speech path
11 intra-customer speech path
12 random trunk speech path
13 reserved path not used

TFS411 36 CCS peg count

TFS411 counts the connections held longer than 36 CCS but less than 50 CCS that have disconnected since the last reporting period. It also includes the total usage (CCS) on the connections if no online device is available to print TFS401 or TFS402 measurements. The TFS411 and TFS412 messages appear between threshold violations and system violations, and between system traffic measurements and customer traffic measurements. Consistently long connections may indicate lengthy data calls, hung timeslots, or hardware faults.

TFS412 50 CCS peg count

TFS412 provides a peg count of the number of connections that were held for 50 CCS or longer that have disconnected since the last reporting period. It also includes the total usage (CCS) on the connections. The TFS411 and TFS412 messages appear between threshold violations and system violations, and between system traffic measurements and customer traffic measurements. If these figures indicate a potential problem, turn on the traffic TTY and examine the TFS401 and TFS402 messages for more information. Consistently long connections may indicate lengthy data calls, hung timeslots, or hardware faults.

TFS501 and TFS502 audit messages

The Software Audit program (LD 44) outputs TFS501 and TFS502 when it releases hung timeslots. (A disconnected call does not necessarily result in a released timeslot.)

TFS501 identifies the loop number and the number of timeslots recovered. TFS502 identifies the junctor group number and the number of timeslots recovered. Data analysts should consider these warning messages when examining traffic statistics for the indicated loops.

Customer traffic reports

Contents

This section contains information on the following topics:

Introduction

LD 02 defines the different report schedules and options available for each customer.

TFC001 networks

TFC001 describes traffic details for each customer group defined in LD 15 (Customer Data Block) on a per call (not timeslot) basis, showing failures to match (FTMs), usage (CCS), peg count, partial dial counts, and abandoned call counts. See Table 23 on page 89 for the TFC001 report format.

The measurements in TFC001 total half those in TFS001, as TFC001 measurements increment for established calls only and two timeslots are used per call.

The maximum blockage for incoming, outgoing, and tandem calls on your system should be 1 percent. Intracustomer blockage should not be more than 4 percent. Determine the grade of service using this formula:

FTM / (peg count + FTM) x 100

Incoming FTM

The incoming FTM increments if a call is blocked (a stage of the call cannot be completed) between the time that an incoming call is recognized and the time that the trunk is idled.

For example, if a call cannot be presented to an idle attendant because of blocking, then an incoming FTM increments. If the call is successfully presented to an attendant, but the attendant cannot extend the call to an idle terminal because of blocking, then an incoming FTM increments. The incoming FTM increments once per incoming call regardless of the type of blocking or combination of blocking.

Incoming usage

The incoming usage accumulates when an established path between any terminal and an incoming trunk is idled.

Incoming peg count

The incoming peg count increments when a seized incoming trunk that had an established connection with a terminal (other than another trunk) is idled.

Outgoing FTM

If a path to an idle outgoing trunk is not found because no timeslot was available, the outgoing FTM increments. A call can increment the outgoing FTM only once. Further attempts to secure a trunk, for example, Ring Again, do not increment the FTM.

Outgoing usage

The outgoing usage accumulates when an established path that includes an outgoing trunk is idled.

Outgoing peg count

When a trunk is seized for an outgoing call and establishes a connection with a nontrunk terminal, the outgoing peg count increments after the trunk is idled.

Intracustomer FTM

The intracustomer FTM measurement increments when a timeslot is not available between a customer's two nontrunk terminals.

Intracustomer usage

When a path is idled, the intracustomer usage number increments to show the total calls between two terminals within a single customer.

Multi-User Login

A traffic file displays and stores system reports and user reports for the Multi-User Login feature.

Intracustomer peg count

The intracustomer peg count increments when an established path between two of a customer's nontrunk terminals is idled.

Tandem FTM

Tandem FTM increments if a timeslot is not available for a path between two trunks. If two attempts to find a path between the originating trunk and an idle outgoing trunk fail, one tandem FTM is pegged.

Tandem usage

Tandem usage accumulates when an established path between two trunks becomes idle.

Tandem peg count

The tandem peg count increments when an established connection between two trunks is idled. Since a tandem call does not increment either incoming or outgoing peg counts, tandem measurements must be added once to both the incoming and outgoing measurements to obtain total incoming and outgoing FTM and peg counts.

Permanent signal

The permanent signal increments when a telephone goes off hook but does not begin dialing within 30 seconds after receiving the dial tone.

The permanent signal increments when a 2500 telephone goes off hook but does not begin dialing within 15 seconds after receiving the dial tone.

Abandon

The abandon count increments when a terminal goes on hook before completely dialing a directory number or trunk access code and number. Abandon does not increment when a trunk has been seized, and the number has been partially outpulsed. It also increments when a 2500 telephone goes off hook, but does not begin dialing within 15 seconds of receiving a dial tone.

Partial dial

Partial dial increments when a 2500 telephone goes on hook before completely dialing a directory number or trunk access code.

Table 23 shows the format and an example of the TFC001 report.

Table 23
TFC001 networks report format

Format			
System ID	TFC001		
Customer number			
Incoming FTM		Incoming CCS	Incoming peg count
Outgoing FTM		Outgoing CCS	Outgoing peg count
Intracustomer FTM		Intracustomer CCS	Intracustomer peg count
Tandem FTM		Tandem CCS	Tandem peg count
Permanent signal		Abandon	Partial dial
Example			
200	TFC001		
000			
00001		0001985	01143
00002		0002909	01732
00003		0000339	00047
00000		0000046	00062
00001		00004	00002

TFC002 trunks

Each trunk group generates a TFC002 report that displays trunk usage. The TFC002 report always prints when an All Trunks Busy (ATB) condition occurs during the reported period. ATB and overflow indicate that additional trunks may be needed. See Table 25 on page 98 for the TFC002 report format.

To determine grade of service, use the following formulas:

Outgoing CCS / Number trunks working = CCS per trunk

(CCS per trunk / 36) x 100 = grade of service

Trunk traffic report options

The options are selected in the Configuration Data Block. The options improve the accuracy of TFC002 reports. Each option can be enabled or disabled (the default condition).

Traffic Period Option

The Traffic Period Option (TPO) allows a customer to enhance the TFC002 reports to accumulate trunk usage data every traffic period instead of accumulating usage only after a call disconnects. Therefore, with this option enabled, trunk usage accumulates at the end of a traffic period even while a call is still established. This option enables the CCS associated with lengthy calls to be reported in each traffic report interval through the call duration. The peg count is reported at disconnect time.

If this option is disabled, trunk usage adds its entire duration into the traffic period in which the disconnect occurs. If the duration is longer than the 36 CCS (where CCS = 100 call seconds), but less than 50 CCS, a TFS401 message is output. However, that duration is still accumulated and included in the traffic reports. If the duration is longer than or equal to 50 CCS, a TFS4032 message is output. This duration is not accumulated, and is excluded from the traffic reports.

Trunk Seizure Option

The Trunk Seizure Option (TSO) provides the ability to start accumulating statistics upon trunk seizure, rather than when the call is established.

If this option is disabled, traffic statistics begin accumulating when a call is established.

The system determines that the call is established when one of the following occurs:

- The End-of-Dialing (EOD) timer times out after the last digit is dialed
- The octothorpe (#) is dialed
- Answer supervision is received

In some situations, customers cannot match traffic reports with their carrier reports, because many carriers start accumulating statistics when a trunk is seized.

Operating parameters

The peg count occurs even if a call is not established.

If the duration of a call is less than two to four seconds, then the peg count is not accumulated. This functionality only applies when the trunk seizure option is enabled.

Feature interactions

Automatic Call Distribution (ACD)

A trunk call to an ACD DN will only be considered established once this call is answered. It is not considered established while this call is waiting in the ACD queue. Therefore, at the end of a traffic period, if a trunk call is in the ACD queue, the Traffic Period Option will not accumulate the duration for this call.

Note: When the duration is accumulated at disconnect or at the end of a traffic period after this call is answered, the total duration including the time the call was in the ACD queue is accumulated. This total duration may be longer than a single traffic period due to the time in the ACD queue and a TFS401, TFS402, or TFS403 message may be output.

Music trunks

The Trunk Seizure Option is not supported on this type of trunk.

Recorded Announcement (RAN) trunks

RAN routes configured as Automatic Wake Up (AWU) are not be printed.

Feature implementation

LD 17 – Enable or disable both options on a system-wide basis.

Prompt	Response	Description
REQ	CHG	Change existing data.
TYPE	CFN	Configuration record
...		
PARM		System Parameters
	(NO) YES	(Do not) change system parameters.
...		
- TPO	(NO) YES	Traffic Period Option Enter YES to enable, NO to disable, and <CR> to keep the current value.
- TSO	(NO) YES	Trunk Seizure Option Enter YES to enable, NO to disable, and <CR> to keep the current value.

If the Trunk Seizure Option is enabled, four fields are added to the trunk usage traffic report. The new fields are highlighted with bold lettering in Table 25.

Table 24
TFC002 trunks report format with Trunk Seizure Option

Format	
System ID	TFC002
Customer number	
Route number	Trunk type
Trunks equipped	Trunks working
Incoming usage at seizure	**Incoming peg count at release of seizure**
Outgoing usage at seizure	**Outgoing peg count at release of seizure**
Outgoing overflow	All Trunks Busy
Toll peg count	All Trunks Busy for non-priority users
Incoming ISA peg count	Outgoing ISA peg count
VNS held usage	VNS reuse peg count
B-channel overload peg count	

Trunk types

TFC002 includes usage, peg count, overflow, ATB, and toll peg count for these trunk types:

ADM	Data port interfacing with Data Line Card
AIOD	Automatic Identification of Outgoing Dialing
CAA	Common Control Switch Arrangement with ANI
CAMA	Centralized Automatic Message Accounting
CCSA	Common Control Switch Arrangement
CO	Central Office
DICT	Dictation
DID	Direct Inward Dialing
FX	Foreign Exchange
FGDT	Feature Group D
ISA	Integrated Services Access
MDM	Modem interfacing with 500-type line card
MUS	Music
PAGE	Paging
RAN	Recorded Announcement
RCD	Emergency Recorder
RLTM	Release Link Main
RLTR	Release Link Remote
TIE	Tie trunks
WATS	WATS lines

Integrated Services Access (ISA) trunks

Two types of routes are configured for ISA trunks: ISA master routes and ISA service routes. ISA master routes are eligible for the full traffic report; the service routes only contain data for the incoming ISA peg count and outgoing ISA peg count fields. No other traffic is tracked for ISA service routes. See Table 25 on page 98 for an example of the report containing ISA fields. For more information on ISA trunks also refer to *ISDN Primary Rate Interface: Features* (553-3001-369) and *ISDN Basic Rate Interface: Features* (553-3001-380).

Trunks equipped

Trunks equipped are the number of trunks working in the route.

Trunks working

The number of trunks enabled in the route appears in this column.

Incoming usage

Incoming trunk usage shows CCS for each trunk and may exceed 36 CCS an hour since it includes the entire time the connection was established. A connection spanning more than one period appears in the report for the period in which it ended. This may result in an understatement of CCS reported for some periods.

Incoming peg count

A path that is eligible for the two following fields, incoming trunk usage and incoming trunk peg count, increments for the ISA service route and for the ISA master route. See *ISDN Primary Rate Interface: Features* (553-3001-369) and *ISDN Basic Rate Interface: Features* (553-3001-380) for more information. This field is followed by a blank line (as Outgoing ISA peg count).

Outgoing usage

Outgoing trunk usage increments in CCS when a trunk assigned to the customer becomes idle.

Outgoing peg count

A path that is eligible for the two following fields, outgoing trunk usage and outgoing trunk peg count, increments for the ISA service route and for the ISA master route. See *ISDN Primary Rate Interface: Features* (553-3001-369) and *ISDN Basic Rate Interface: Features* (553-3001-380) for more information. This field is followed by a blank line (as Incoming ISA peg count).

Outgoing overflow

Outgoing trunk overflow increments when no idle enabled trunk is available to respond to a trunk request, even if the request searches other routes for an idle trunk or the caller initiates Ring Again. If a trunk is idle and enabled but timeslots are not available, then outgoing trunk overflow does not increment. Use the following formula to determine route blockage:

Overflow peg count / (outgoing peg count + overflow peg count) x 100

The maximum desired blockage for a central office trunk is 1 percent, and average holding time should be approximately 2 to 3 minutes. The maximum desired blockage for most other trunks is 2 to 5 percent, with an average holding time of 4 to 5 minutes. Average trunk use is 20 CCS and 25 CCS is high trunk usage.

Outgoing trunk connections are not considered complete until the end-of-dialing (EOD) timer expires after the last digit is dialed. Connections shorter than the EOD timer do not accumulate traffic data as complete connections. End-of-dialing can be forced by pressing the pound sign (#) to override the timer.

If an outgoing trunk call disconnects before the EOD timer expires, TFS001 usage accumulates. TFS001 peg count, TFC001, and TFC002 do not increment.

All Trunks Busy

All Trunks Busy (ATB) increments when all trunks in a group (with more than one trunk) are busy. A high ATB combined with high overflow indicates system blockage. High ATB and low overflow reflect efficient system use. To calculate the percentage of calls seizing the last available trunk, use the following formula:

All trunks busy / (outgoing peg count + outgoing overflow peg count) x 100

To determine blockage based on the overflow, use this formula:

Overflow peg count / (outgoing peg count + overflow peg count) x 100

Toll peg count

Toll peg count for CO and FX routes increments when the first or second meaningful digit dialed after the access code is either a "0" or a "1." (Use the NATL and TDIG prompts in LD 16: Route Data Block, Automatic Trunk Maintenance to define other digits as toll digits.) A meaningful digit is one that is not absorbed by either the system or by the connecting CO. Even if the call is abandoned after the first meaningful digit, the toll peg count increments, possibly resulting in a toll peg count that exceeds the actual number of completed calls. Determine the percentage of toll calls by using the following formula:

Toll peg count / outgoing peg count x 100

A high percentage of toll calls reflects a need to evaluate alternative routing or trunk use.

All Trunks Busy for non-priority users

This field is only output for FGDT, CO, FEX, WATTS, TIE, and DID trunks, if the Preference Trunk Usage package (308) and Multi Frequency Compelled package (128) are equipped, and PCAT and Trunk Usage Threshold, PTUT, are configured.

Incoming ISA peg count

The incoming ISA peg count increments for the trunk group when an incoming ISA trunk assigned to the customer becomes idle.

Outgoing ISA peg count

The outgoing ISA peg count increments for the trunk group when an outgoing trunk assigned to the customer becomes idle.

Trunk Seizure Option

If the Trunk Seizure Option is enabled, data in the fields for trunk usage depend on when the trunk is seized, not when the trunk is established. Therefore, anytime a trunk becomes busy, duration will be accumulated in the new trunk usage traffic report field.

If the Trunk Seizure Option is enabled, the fields for trunk peg count apply to all calls that seize the trunk. Therefore, whether this call is established or not,

as long as the call seizes the trunk, this call is pegged in the trunk peg count traffic report field.

Virtual Network Services (VNS)

VNS held and VNS reuse fields are only output if the VNS package (183) is equipped.

B-channel overload

This field is only output for DMS-100, DMS-250, SL-100, AT&T #4 ESS, and NI-2 trunks with B-Channel Overload Control Timer (BCOT) configured.

Table 25 shows the format and an example of the TFC002 report.

Table 25
TFC002 trunks report format with ISA service routes format (Part 1 of 2)

Format	
System ID	TFC002
Customer number	
Route number	Trunk type
Trunks equipped	Trunks working
Incoming usage	Incoming peg count
Outgoing usage	Outgoing peg count
Outgoing overflow	All Trunks Busy
Toll peg count	All Trunks Busy for non-priority users
Incoming ISA peg count	Outgoing ISA peg count
VNS held usage	VNS reuse peg count
B-channel overload peg count	

Table 25
TFC002 trunks report format with ISA service routes format (Part 2 of 2)

Example	
200	TFC002
007	
004	ISA
00008	00007
0000088	00046
0000114	00052
00001	00002
00006	00000
00000	00000

Note 1: ISA master routes do not include incoming All Trunks Busy for non-priority users, ISA peg count, and outgoing ISA peg count in the traffic reports.

Note 2: Based on the system configuration, not all fields in the printed traffic report provide trunk usage information.

TFC003 customer console queue measurements

TFC003 examines the treatment of calls in customer queues. It examines the following:

- speed of response
- number of calls delayed
- number of calls abandoned
- average wait time of delayed calls
- average wait time of abandoned calls

Timing measurements accumulate in 2 second units and appear in 0.1 second units. The fewer the calls in the sample (fewer than ten), the less reliable the data. See Table 26 on page 102 for TFC003 report format.

Systems with the Centralized Attendant Service (CAS) remote feature also receive TFC003 measurements for Release Link Trunks (RLT) for both local and remote attendants.

Average speed of answer

Average speed of answer shows how long (in 0.1 seconds) a delayed call waits in the attendant queue. Attendant response time indicates how long the attendant takes to answer the call after it has been presented to a loop key on the console. Determine average answer speed with the following formula:

[(calls delayed x avg time in queue) / total calls] + avg attendant response

Example

Peg count in queue = 2
Average time in queue = 3 seconds
Average attendant response = 2.4 seconds
Total calls = 9
Average speed of answer = [(2 x 3) / 9] + 2.4 = 3.1 seconds

The percentage of the total calls (including incoming calls, dial “0” calls, and recalls) that enter the attendant queue is not recorded, preventing analysis of the correlation between average speed of answer, average attendant response, and average time in queue.

Average attendant response

Average attendant response is the average time (in 0.1 seconds) that elapses between a call being presented to an attendant console and the attendant answering it. If the attendant answers a different call using the Incoming Call Identification (ICI) keys, time accumulates as if the call answered were the one first presented.

Calls delayed peg count

This peg count increments whenever a call is removed from the attendant queue. A call that is removed from and then returned to the queue (because a

second call was selected using an ICI) increments the measurement only once as if the first call had remained in the queue throughout. Calls abandoned at any point do not increment this count. To determine the percentage of delayed calls, use the following formula:

Calls delayed peg count / (internal calls + external calls peg count) x 100

Average time in queue

The total amount of time (in 0.1 seconds) that calls spend in the attendant queue is divided by the number of calls placed into that queue. If a call is presented to the attendant but a different call is selected using the ICI keys, the time accumulated adjusts so that the ICI call appears to have been presented first.

Abandoned calls peg count

This measurement increments whenever a call leaves the attendant queue without being answered. To determine the percentage of calls abandoned, use the following formula:

Abandoned calls / (internal + external console calls + abandoned calls) x 100

Average wait time of abandoned calls

This is the average time, in tenths of seconds, that a call waited before disconnecting.

Table 26 shows the format and an example of the TFC003 report.

Table 26
TFC003 customer console measurements report format

Format	
System ID	TFC003
Customer number	
Average speed of answer	Average attendant response
Calls delayed peg count	Average time in queue
Abandoned calls peg count	Average wait time of abandoned calls
Example	
200	TFC003
003	
00107	00048
00289	00079
00015	00192

TFC004 individual console measurements

These measurements examine calls by attendant, providing the total number of calls handled by each attendant console, the calculated work time per call, and the total amount of time that the console was attended. A call that is answered by an attendant, extended to an internal DN, and recalled to an attendant, appears as a new call in these measurements. See Table 27 on page 106 for the TFC004 report format.

Compare the figures in TFC004 (Table 27 on page 106) with those in TFC003 (Table 26 on page 102) to determine whether any problems originate with equipment or with attendants.

Peg count of internal calls handled by attendant

This measurement increments when an internal call disconnects from the console. This includes calls originated by the attendant, internal calls to the attendant (dial “0”), attendant accessing paging, and recalls from camped on or ring no answer calls. Any internal call increments this peg count when it is removed from the console, whether or not it has been extended.

The peg count for internal calls handled by the attendant plus the count for external calls handled by the attendant equals the total calls the attendant handles.

Total time spent servicing internal requests

This is the total time, in CCS, that an attendant handles active internal or outgoing calls originating in the system. (The system records the CCS after the call is removed from the console or held on the console. A held call that is reactivated accrues additional CCS.)

Peg count of external calls handled by attendant

This peg count includes calls to a Listed Directory Number (LDN) in a Direct Inward Dial (DID) system, and Central Office (CO), Wide Area Telephone Service (WATS), and Foreign Exchange (FX) trunks that terminate on the console as well as busy DID calls that hunt to the attendant. Any internal call increments this peg count whenever it is removed from the console, whether or not it is extended.

If a call comes in, and the attendant extends it to a telephone, it is pegged as an external call. If that same call recalls back to the attendant, it is pegged again as an internal call.

Total time spent servicing external requests

This is the total time, in CCS, that an attendant has active incoming calls on the console. Time accumulates when the call is removed from the console or is held on the console. A call on hold accumulates more time after it is reactivated.

Total time console is attended

This is the total time, in CCS, that the console is not in Night Service or Position Busy. Calls that originate or complete when the console is in Night Service or Position Busy do not appear in this figure.

Total time spent servicing calls

This is the total time, in CCS, that each attendant spends servicing internal (including those originated by the attendant) and external call requests, with a peg count and work time. The total time spent servicing calls may not equal the sum of the total time spent servicing internal and external requests because of approximations.

The total time a console is in use plus the total time the console is in Night Service or Position Busy is equal to the total available time.

Number of times all attendant loops are busy

This measurement increments when all loop keys on the attendant console are busy.

Attendant Alternative Answering (AAA) peg count

This measurement, indicates the total number of attempts to forward a call to AAA. For a complete description of AAA, see *Features and Services* (553-3001-306).

Successful AAA termination peg count

The termination peg count indicates the total number of successful terminations to an AAA position. For a complete description of AAA, see *Features and Services* (553-3001-306).

Calculate attendant performance

Use the following formulas to determine attendant performance.

Total number of calls handled by the attendant

All console internal peg count + all consoles external peg count + abandoned call peg count in TFC003

Average number of calls per attendant

All attendants' total number of calls / number of attendants

Percentage of delayed calls

Delayed calls peg count in TFC003 / (internal peg count + external peg count for each console) x 100

Percentage of abandoned calls

(Abandoned call peg count from TFC003 / total number of calls handled by all attendants) x 100

Average work time per call for all attendants

Total work time for all attendants / (all attendants' internal + external peg counts) x 100

Percentage of manned time for all attendants

Total manned time for every attendant / (36 x number of attendants manned) x 100

Table 27 on page 106 shows the format and an example of the TFC004 report.

Table 27
TFC004 individual console measurements report format

Format	
System ID	TFC004
Customer number	
Attendant number	
Peg count of internal calls handled by an attendant	Total time spent servicing internal requests
Peg count of external calls handled by an attendant	Total time spent servicing external requests
Total time a console is attended	Total time spent servicing calls
Number of times all attendant loops are busy	
Total AAA attempt peg count	Successful AAA termination peg count
Example	
200	TFC004
000	
001	
00076	0000011
00167	0000017
000036	0000029
00000	
00005	0000003
002	
00057	0000012
00066	0000021
000036	0000033
00000	
00004	0000003

TFC005 feature key usage

This report looks at patterns of customer usage: which features are activated from Meridian 1 proprietary telephones or attendant consoles. Feature key usage does not include programming changes (for example, changing a Call Forward Directory Number).

Table 28 shows the format and an example of the TFC005 report.

Table 28
TFC005 feature key usage report format

Format	
System ID	TFC005
Customer number	
Feature number	Peg count
Example	
200	TFC005
000	
000	00012
001	00002
002	00003
003	00015
...	...
049	00000

Each member of a conference causes an increment to the count. For example, a five-party conference pegs three times, once for each conferee added to the original two parties.

A peg count appears for each feature per specified customer. Each feature has its own output line, identified by number (see Table 29 on page 108).

Table 29
TFC005 feature numbers

Number	Feature	Number	Feature
000	Auto Dial	025	Group Call
001	Call Forward	026	Auto Answerback
002	Call Pickup	027	Trunk-Mail Access Restriction
003	Call Transfer	028	Trunk to Trunk Connection
004	Call Waiting	029	Call Park
005	3-Party Conference	030	Stored Number Redial
006	6-Party Conference	031	Last Number Redial
007	Manual Signaling	032	Malicious Call Trace
008	Override	033	Enhanced Hot Line
009	Privacy Release	034	Group Pickup
010	Private Line Service	035	DN Pickup
011	Ring Again	036	Attendant End-to-End Signaling
012	Speed Call	037	Attendant Break In
013	Voice Call	038	Attendant Break In Busy Verify
014	Volume Control	039	Semi-automatic Camp On
015	Busy Verify	040	Series Call Activation
016	Barge-in	041	Ringing Change
017	Call Selection	042	see Note
018	Attendant Recall	043	End-to-End Signaling
019	Dial Intercom	044	Internal Call Forward
020	Message Waiting Indicator	045	Attendant Remote Call Forward
021	Message Indication	046	BRI Call Forward
022	Message Cancellation	047	Network Intercom
023	Message Center INCALLS	048	see Note
024	Attendant Overflow	049	see Note

Note: Feature numbers 42, 48, and 49 are reserved. The peg count for these is always zero.

Note 1: With Attendant Blocking of DN (ABDN) equipped, each fulfilled ABDN attempt (DN rung) increments the peg-count register under the Semi-Automatic Camp-on feature.

Note 2: With Attendant Break-In (BKI) equipped, each break-in increments the peg-count register under the Busy Verify feature.

Note 3: With Attendant and Network Remote Call Forward equipped, each press of the RFW key increments the peg-count register under feature number 77 in the TFC005 feature key usage report.

TFC006 Radio Paging

These measurements give the number of calls processed by Radio Paging. Table 30 shows the TFC006 report format and Table 31 on page 110 explains the contents of each field in the report.

Table 30
TFC006 Radio Paging report format

Format							
System ID		TFC006					
Customer Number							
RPA	SYS bb	cccc	dddd	eeee	ffff		% Paging count
		gggg	hhhh	iiii	jjjj		% Selection, auto/manual
		kkkk	llll	mmmm	nnnn	oooo	% Mode counts
		pppp	qqqq	rrrr	ssss		% Average time
		tttt	uuuu	vvvv			% RAN

Table 31
TFC006 Radio Paging report fields

Field	Measurement
bb	RPA system number
cccc	Request peg count
dddd	Request being blocked peg count
eeee	Request abandoned by caller
ffff	Preselection peg count
gggg	Postselection peg count
hhhh	Auto mode peg count
iiii	Manual mode peg count
jjjj	Diversion peg count
kkkk	Paging mode 1 peg count
llll	Paging mode 2 peg count
mmmm	Paging mode 3 peg count
nnnn	Paging mode 4 peg count
oooo	Paging mode 5 peg count
pppp	Paging time out (TATECO only)
qqqq	Average answer time (in 2 second units)
rrrr	Recall count
ssss	Average time in using paging trunk (in 2 second units)
tttt	RAN request count
uuuu	RAN request fail count
vvvv	Average RAN connect time (in 2 second units)

Radio Paging measurements

The Radio Paging measurements count each time a call is made with the preselection method, the postselection method, or the paging time limit (paging timeout).

Parallel Radio Paging measurements

Paging Recall counts increments whenever an attempted paging call returns to the attendant.

Average answer time count is the average time that the paged calls are in queue before being answered.

Serial Radio Paging measurements

Automatic mode counts increments each time an automatic serial paging call is attempted.

Manual mode counts increments each time a manual serial paging call is attempted.

TFC007 Call Park

Traffic measurement data accumulates for the following Call Park items. See Table 32 on page 112 for the TFC007 report format.

System Park peg count

This count identifies the number of calls parked to a System Park DN.

System Park overflow peg count

This count identifies the number of calls that could not be parked because a System Park DN was not available.

Station Park peg count

This count identifies the number of calls parked to a Station Park DN.

Parked call access peg count

This count identifies the number of parked calls successfully accessed.

Park recall peg count

This count identifies the number of parked calls that were recalled after the Call Park Recall Timer expired (defined in LD 50: Call Park and Module Telephone Relocation).

Average wait time in Call Park

This value (expressed in units of 0.1 second) reflects the average time that parked calls waited before access.

Table 32
TFC007 call park report format

Format					
System ID	TFC007				
Customer number					
System Park peg count	System Park overflow peg count	Station Park peg count	parked call access peg count	parked call recall peg count	average wait time in park in seconds
Example					
0001	TFC007				
000					
00004	00000	00000	00003	00001	00360

TFC008 messaging and Auxiliary Processor links

This report provides traffic data on messaging and Auxiliary Processor links. See Table 33 on page 116 for the TFC008 report format and the applicable legend.

Auxiliary Processor Link (APL)

This section of the report shows the APL number and its statistics. The information about the APL includes the following:

- output queue overflow (from system to auxiliary processor)
- input queue overflow (from auxiliary processor to system)
- average output queue size
- average input queue size
- total time (in seconds) the APL was not operating
- total time (in seconds) input message call register was unavailable
- total 4-second timeouts
- total negative acknowledgments
- total out of synchronization characters received from the system

Output message traffic

This information indicates the type and number of messages the system sends to the APL.

Input message traffic

This information concerns the type and number of messages the APL sends the system.

Message attendant queue

This section describes the Automatic Call Distribution DN (ACD DN) assigned to the queue, showing the ACD DN assigned as well as operation information.

- Command Status Link (CSL) Value Added Server ID (VAS ID)
- APL number
- total calls in the message attendant queue
- total direct calls to the message attendant
- total indirect calls to the message attendant
- total abandoned calls to the message attendant
- average time calls waited before abandoning
- average delay (time spent waiting for calls / number of calls answered)
- direct call processing time each message attendant spent handling answered calls to the ACD DN
- post call processing time each message attendant was in Not Ready

Telephone status

This part of the report gives information regarding the telephone usage. The information it provides includes the following:

- ACD DN
- Value Added Server ID (VAS ID)
- total telephone status calls
- total calls accessing Special Prefix (SPRE) codes
- total call forward access calls
- total key access calls
- total unsuccessful messaging calls

Telephone messaging

This section of the report provides information about telephone messaging. The information provided includes the following:

- ACD DN
- Value Added Server ID (VAS ID)
- APL number
- total calls in the message attendant queue
- total telephone status calls
- total successful telephone status calls
- total abandoned calls
- total unsuccessful telephone status calls
- average telephone message processing time (in seconds)
- total telephones requesting the message attendant

Table 33
TFC008 messaging and Auxiliary Processor links report format

Format										
System ID			TFC008							
Customer number										
APL										
apl#	outq ovfl	inpq ovfl	avgoq size	avgiq size	down time	icr uav	to	nak	char synch	
omsg	cas	crs	pci	ans	dis	dnp	digit	tmg	tst	mwi
	uts	tnmn	confm	data	audit	cts	dsi	timstp	query	ovd
	calans	calds	usm	ceq	cab	setftr	mon	iqs	its	iss
	icc	ias	itc	init	isis	iei	icss	sfn		
imsg	con	incl	rls	offh	rdy	nrdy	msi	msb	conf	mwi
	opr	gts	tnmn	alrm	confm	data	audit	rtsc	tmsp	query
	calans	calds	setftr	mon	iqr	itr	isr	isi	iei	icsr
PACKET			xxxxx							
MAQ										
acddn	vasid	apl#	qlngth	drct	indrt	abn	avgwt		avgdly	dcp
TST										
acddn	vasid	apl#	total calls	spre	cfw	ust	fail			
TMG										
acddn	vasid	apl#	qlngth	total calls	succ	abn	fail	avg time	rqst	

Legend for TFC008 report

abn	total number of abandoned calls
acd dn	Automatic Call Distribution (ACD) Directory Number (DN)
APL	Auxiliary Processor Link
apl#	Auxiliary Processor Link (APL) number, if used
avg dly	the average delay equals total waiting time for all calls divided by the number of calls answered on this ACD DN (abandoned calls are not included in total)
avg time	average telephone messaging processing time in seconds
avgwt	average time (in seconds) that calls waited before being abandoned
avgiq size	average input queue size
avgoq size	average output queue size
cfw	total number of call forward access calls
char synch	input characters from processor to system out of synchronization
dcp	direct call processing time is the average time (in seconds) that each message attendant spent handling answered calls to this ACD DN
down time	total APL down time in seconds
drct	total number of direct calls to the message attendant or Voice Mail System (VMS) processor queue
fail	total number of unsuccessful telephone messaging or status calls
icr uav	input message call register unavailable
imsg	input message traffic count (by message type)
indrt	total number of indirect calls
inpq ovfl	input queue overflow (processor to system)
MAQ	Message Attendant Queue
nak	total number of negative acknowledgments
ocr uav	output message call register unavailable
omsg	output message traffic count (by message type)
outq ovfl	output queue overflow (system to processor)
packet	output packet message count from system to auxiliary processor

pcp	post call processing is the average time (in seconds) that each message attendant or VMS processor was “not ready” per answered call to this ACD DN
qlngth	total number of calls in the message attendant queue or VMS processor queue
rqst	total number of telephone messaging calls that requested the message attendant
spre	total number of special prefix access calls
succ	total number of successful telephone messaging calls
TMG	Telephone Messaging
to	total 4-second timeout count
total calls	the total number of telephone status calls
TST	Telephone Status
ust	total number of user key access calls
vas id	the VAS ID of the associated link, if using Command Status Link (CSL)

Output messages (omsg):

cas	Channel Assignment
crs	Connection Request Response
pci	Present Call
ans	Call Answered
dis	Disconnect
dnp	DN Update
digit	Key Message Digit
tmg	Telephone Message
tst	Telephone Status Message
mwi	Message Waiting Indication
uts	Update Terminal Status
tnmn	Terminal Maintenance
confm	Administration Confirmation
data	Data Message
audit	Audit Message
cts	Change Terminal Status
dsi	Device State Information
timstp	AML Time Stamp

query	Server Query
ovd	Overload Warning
calans	Call Answer
calds	Call Disconnect
usm	Unsolicited Status Message
ceq	Call Enters Queue
cab	Call Abandons Queue
setftr	Feature Invocation Message
mon	Host Control Monitor of the Unsolicited Status Messages
iqs	Queue/Dequeue Request Response
its	Treatment Request Response
iss	ACD Statistics Request Response
icc	Incoming Call
ias	ACD Statistics
itc	Treatment Completed
init	System Initialization
isis	Start Up/Shut Down Indication Response
iei	Error Indication
icss	Check CDN State Response
sfn	Set Feature Notification
Input Messages (imsg):	
con	Connection Request
incl	Incoming Call Accept
rls	Call Disconnected Request
offh	Off hook
rdy	Ready
nrdy	Not Ready
msi	In Service
msb	Make Set Busy
conf	Confirmation Message
mwi	Message Waiting Indication
opr	Operator Revert
gts	Get Terminal Status

tnmn	Terminal Maintenance
alrm	Alarm Message
confm	Administration Confirmation
data	Data Message
audit	Audit Message
rtsc	Report Terminal Status Change
tmsp	AML Time Stamp
query	Server Query
calans	Call Answer
calds	Call Disconnect
setftr	Feature Invocation Message
mon	Host Control Monitor of the Unsolicited Status Messages
iqr	Queue/Dequeue Request
itr	Treatment Request
isr	ACD Statistics Request
isi	Start Up/Shut Down Indication
iei	Error Indication
icsr	CDN Check Request

TFC009 Network Attendant Service

The traffic data for the Network Attendant Service (NAS) describes attempts to route to NAS. See Table 34 on page 121 for the TFC009 report format.

NAS TRY

This number indicates the number of attempts to route to the Network Attendant Service (NAS).

ALT

This number is the total number of attempts to route to NAS across alternate routes.

DB

This shows the number of drop back busies over the NAS alternate route.

ALT + DB = NAS TRY

Table 34
TFC009 Network Attendant Service report format

Format		
System ID	TFC009	
Customer number		
NAS TRY		
	ALT1	DB
Example		
0000	TFC009	
087		
NAS TRY	00048	
	ALT1: 00004	DB: 00000
	ALT2: 00010	DB: 00003
	ALT3: 00025	DB: 00000
	ALT4: 00000	DB: 00006

TFC101 incoming matching loss threshold

This threshold level shows the percentage of incoming calls (expressed in units of 0.1 percent) that encounter a Failure To Match (FTM). FTMs occur when a connection between an incoming trunk and the called line or attendant fails, or when an attendant does not complete a call because timeslots are unavailable (even if the call is eventually presented). A call counts as one incoming FTM, regardless of the number of times that call completion attempts failed.

Table 35 shows the format and an example of the TFC101 report.

Table 35
TFC101 incoming matching loss threshold violation report format

Format	
System ID	TFC101
Customer number	
Incoming FTM	Threshold
Example	
200	TFC101
000	
0014	00010

The threshold figure represents the desired maximum percentage of FTMs in 0.1 percent.

The TFC101 triggers a TFS001 system measurement report to assist with analysis of the problem loop.

TFC102 outgoing matching loss threshold

This threshold is based on the percentage of outgoing calls (expressed in units of 0.1 percent) that encounter a failure to match when connecting to an outgoing trunk. A call counts as one outgoing FTM regardless of further failures to complete the call. TFC102 triggers a TFS001 network report.

Table 36 shows the format and an example of the TFC101 report.

Table 36
Outgoing matching loss threshold violation report

Format	
System ID	TFC102
Customer number	
Outgoing FTM	Threshold
Example	
200	TFC102
002	
00014	00010

The threshold figure represents the desired maximum percentage of FTMs in units of 0.1 percent.

TFC103 average speed of answer threshold

The speed of answer threshold is the minimum acceptable time, in units of 0.1 second, that calls wait to be answered by the attendant. The recommended setting is 00120, which translates to 12.0 seconds. TFC103 shows the actual average speed of answer. If the average speed exceeds the threshold, the TFC003 (queue) and TFC004 (console) reports print.

Table 37 shows the format and an example of the TFC103 report.

Table 37
Average speed of answer threshold violation report format

Format	
System ID	TFC103
Customer number	
Average speed of answer	Threshold
Example	
200	TFC103
000	
00152	000120

TFC104 percent all trunks busy threshold

This threshold level indicates the desired maximum percentage of time (in units of 0.1 percent) that all trunks in a trunk group should be busy. (Only trunk groups with more than one member are measured.) The recommended maximum is 00050, which is equivalent to 5 percent. TFC104 shows the actual percentage of time that all trunks are busy.

All calls except outgoing trunk calls are considered successful as soon as they are answered or established. Outgoing trunk calls are considered successful only when the end-of-dialing timer expires or a pound sign (#) is pressed to force an end of dialing. Calculate the threshold using the following formula:

All trunks busy peg count / (successful calls + overflows)

Table 38 shows the format and an example of the TFC104 report.

Table 38
Percent all trunks busy threshold violation report

Format	
System ID	TFC104
Customer number	
Trunk group	
All trunks busy	Threshold
Example	
200	TFC104
002	
004	
0014	00017

TFC105 ISPC links establishment report

The ISPC links establishment report provides a peg count of the number of ISPC links established by an Australian Central office for each Phantom loop for each trunk defined.

Table 39 shows the format and an example of the TFC105 report.

Table 39
ISPC links establishment report format

Format	
System ID	TFC105
Customer number	
loop number	peg count
Example	
200	TFC105
003	
100	50
110	2

In the example in Table 39, the customer 003, on the system 200, has two phantom loops. The loop 100 had 50 ISPC links establishment and loop 110 had 2 ISPC link establishments.

TFC111 usage of Broadcasting routes

This report provides traffic data on the usage of broadcasting routes.

Trunk Type

This field identifies either Music (MUS) or Recorded Announcement (RAN) broadcast trunk types.

Successful Broadcast connections peg count

The number of successful broadcast connections to trunks associated with this route.

Average call duration

Average duration of broadcast connections for this route.

Average waiting time

Average waiting time (in seconds) between the RAN/MUS request and the moment RAN/MUS is given.

Maximum waiting time

Longest waiting time (in seconds) between the RAN/MUS request and the moment RAN/MUS is given.

Waiting time threshold peg count

Incremented each time this threshold (configured in the route data block) is exceeded (output as 0 if not applicable).

Number of waiting parties threshold peg count

Incremented each time this threshold (configured in the route data block) is exceeded (output as 0 if not applicable).

Broadcast connections peg count for the three lowest usage trunks

For each trunk of the broadcasting route, a peg count is incremented each time the trunk reaches its broadcast connections (64 for a music trunk) limit

(depends on the value configured for the CONN prompt in the RAN route data block). Three lowest counters are output.

> ***Note:*** The TFC002 report (trunks report) is not modified. A trunk with one or more connections provides the same data as if only one connection was set up.

Table 40 shows the format and an example of the TFC111 report.

Table 40
TFC111 usage of Broadcasting routes report format

Format		
System ID	TFC111	
Customer number		
Route Number	Trunk Type	
Successful Broadcast connections peg count	Average call duration	Average waiting duration
Maximum waiting time	Waiting time threshold peg count	Number of waiting parties threshold peg count
Broadcast connections peg count for lowest usage trunk		Broadcast connections peg count for next to next to lowest usage trunk
Example		
0200	TFC111	
000		
031	RAN	
00817	00006	00004
00007	00000	00000
00000	00000	00002

Customer network traffic reports

Contents

This section contains information on the following topics:

Introduction

A switch equipped with the Network Traffic (NTRF) software package provides network traffic measurements.

TFN001 route list measurements

A route list is a programmed series of outgoing alternate trunk routes to a specific location. The maximum number of definable route lists is 64.

The routing traffic measurements in TFN001 show how often a route list was accessed, which entries in the list were used, and whether the call was successful in completing a selection or connection. Routing traffic measurements, described below, are available at both node and main sites. See Table 41 on page 134 for the TFN001 report format.

> ***Note:*** Fields for features not equipped or activated always show zeros (0).

Route list measurements

A variety of measurements describe each route list.

Route list requests

This count increments each time the system selects a specific route list.

Route list requests served without delay

This measurement indicates the number of calls that did not encounter blockage or queuing. The count increments when a route list is selected, and a call is assigned to a trunk immediately. The count includes expensive route acceptances.

Expensive route acceptances

Callers can choose to route a call over an expensive route by choice after being informed of the additional cost by the Expensive Route Warning Tone (ERWT). The count increments after call completion.

Route list requests standard blocking

This measurement shows calls that could not access a route or a queue. The blocked call may be given an overflow tone or a recorded announcement, or

be routed to the attendant. The count increments when one of the following occurs:

- the caller's Facility Restriction Level (FRL) is not sufficient to select any route choice
- no route choice is available, and the caller is only allowed Off Hook Queuing (OHQ) but too many calls are already queued
- the call times out in the Off Hook Queue
- blocking occurs and the system cannot select another route choice, and OHQ and Call Back Queuing (CBQ) are denied

Reuse count of on hold VNS trunks

This measurement identifies the total number of calls which successfully reused an established VNS trunk on a given route (outgoing and incoming calls).

Total time VNS trunks were idle

This measurement identifies the amount of time an established VNS trunk was available for re-use on a given route.

Route list entry use

This measurement is the number of calls successfully routed over each particular route list entry (trunk route). The count increments when one of the following occurs:

- an entry is selected without being offered OHQ or CBQ
- an entry is selected after OHQ or OHQ timeout
- an entry is selected to process a CBQ call back

Off Hook Queuing measurements (OHQ)

Each route list has associated OHQ traffic measurements.

OHQ calls

This measurement identifies the number of calls that attempted to use a route list entry when facilities were unavailable. The count increments each time a call is placed in the OHQ to await facilities, including calls from stations at a node, main, or conventional main and calls made using the Direct Inward System Access (DISA) feature.

Average time in OHQ

The queue handler records the time that the call is placed in the OHQ and the time that it is removed from the OHQ. The route list accumulates this elapsed time, in units of 0.1 seconds, only under one of these conditions:

- an entry becomes available
- the OHQ time limit expires and the call is removed from the OHQ
- the caller abandons a call while waiting in the OHQ

Quantity of calls abandoned while in OHQ

This measurement identifies the number of calls placed in the OHQ then disconnected by the caller or the OHQ timer. The count increments when a station at a node, main, or conventional main disconnects during the OHQ offer or while waiting in the OHQ.

Call Back Queuing measurements

Traffic measurements for Call Back Queuing (CBQ) are associated with each route list and identify the use of the feature.

CBQ calls

This measurement shows how many calls were offered CBQ, how many accepted the offer, and how many were placed in the CBQ. The count increments each time a call is placed in the CBQ.

Average time in CBQ

This measurement identifies the average time that calls remain in the CBQ. The measurement increments when a local station accepts the CBQ offer and places the call in the CBQ.

The queue handler stamps the time that a call is placed in the CBQ and the time that it is removed from the CBQ. The elapsed time, in units of 0.1 second, is added to the accumulating count for the route list.

Quantity of CBQ offerings

This measurement identifies the number of calls offered CBQ call backs, regardless of whether the CBQ call back was answered. The count increments when the caller is presented with the CBQ call back.

Quantity of CBQ user cancellations

This measurement identifies the number of times that a caller deactivates Ring Again to remove a call from the CBQ.

Remote Virtual Queuing measurements

If Remote Virtual Queuing (RVQ) is equipped and activated, RVQ traffic measurements appear in the TFN001 printout. Each route list has RVQ traffic measurements that identify feature use.

RVQ calls

This count increments each time the caller selects RVQ.

Average time in RVQ

This measurement tracks the elapsed time between a caller accepting the RVQ and the RVQ call placement.

The queue handler records the time that a call is placed in RVQ and the time that it is removed from RVQ, adding the elapsed time, in 0.1 seconds, to the route list's running total.

Quantity of RVQ offerings

This measurement identifies the number of RVQ calls offered RVQ call backs, regardless of whether the call back was answered. The count increments when the caller is presented with the RVQ call back.

Quantity of RVQ user cancellations

This measurement identifies the number of RVQ calls removed from the RVQ process after the user deactivates Ring Again.

Table 41 shows the format and an example of the TFN001 report.

Table 41
TFN001 route list measurements report format (Part 1 of 2)

Format									
System ID	TFN001								
Customer number									
RLST	xxx	route list requests	route list requests served without delay	expensive route acceptance	route list requests standard blocking	reuse count on hold VNS trunks	total time VNS trunks were idle		
	RT		route list entry use	route list entry use	route list entry use	route list entry use	route list entry use	route list entry use	route list entry use
			TD calls	TD calls	TD calls	TD calls	TD calls	TD calls	
	OHQ	OHQ calls	time in OHQ	abandoned calls					
	CBQ	CBQ calls	average time in CBQ	CBQ offerings		CBQ user cancel			
		RVQ	RVQ calls	average time in RVQ	RVQ offerings	RVQ user cancel			

Table 41
TFN001 route list measurements report format (Part 2 of 2)

Example									
0434	TFN001								
000									
RLST	000	00345	00344	00012	00000	00000	00000		
	RT		00000	00000	00000	00000	00000	00000	00000
			00000	00000	00000	00000	00000	00000	00000
			00000	00000	00000	00000	00000	00000	00000
			00000	00000	00000	00000	00000	00000	00000
			00000	00000	00000	00000	00000	00000	00000
			00000	00000	00000	00000	00000	00000	00000
			00000	00000	00000	00000	00000	00000	00000
			00000	00000	00000	00000	00000	00000	00000
	OHQ	00000	00000	00000					
	CBQ	00000	00000	00000	00000				
	RVQ	00000	00000	00000	00000				

TFN002 Network Class of Service measurements

Traffic measurements for each defined Network Class of Service (NCOS) group indicate the grade of service, in terms of blocking and queuing delay. If a grade of service is not appropriate for users in a particular NCOS group, users can be reassigned to another NCOS group, the characteristics of the existing NCOS group can be redefined, or the routing parameters can be changed. See Table 42 on page 138 for the TFN002 report format.

> ***Note:*** Fields for features not equipped or activated always show zeros (0).

Quantity of calls attempted

This measurement identifies the total number of network call attempts by users assigned to this NCOS group.

Routing requests served without delay

This measurement identifies the number of call attempts routed without encountering blockage or being offered queuing.

Expensive route acceptances

This count increments if a user allows a call to complete over an expensive facility.

Network call standard blocking

This measurement identifies the number of call attempts by NCOS user groups that could not be served because a route or queuing process was not available.

Calls refusing expensive routes

This measurement identifies the number of callers that received an Expensive Route Warning Tone (ERWT), and either abandoned the call or activated the Ring Again feature to place the call in the Call Back Queue.

Quantity of calls placed in OHQ

This measurement identifies the number of calls by NCOS groups that were offered Off Hook Queuing (OHQ) and accepted the offer.

Average time in OHQ

This measurement identifies the average duration, in 0.1 seconds, that calls remained in the OHQ. Calls that time out in the queue are included in the average.

Quantity of CBQ calls

This measurement identifies the number of calls that accepted CBQ.

Average time in CBQ

This measurement identifies the average time (in units of 0.1 second) that calls in this NCOS group waited in the CBQ for an available route. The measurement includes calls requesting a CBQ cancellation, calls completed, and calls initiating direct Ring Again against trunks.

Quantity of RVQ calls

This measurement identifies the number of calls accepting RVQ.

Average time in RVQ

This measurement identifies the average time (in units of 0.1 second) that calls in this NCOS group waited in RVQ for an available route. The measurement includes calls requesting RVQ cancellation, calls completed, and calls initiating direct Ring Again against trunks.

Note: Statistics for OHQ, CBQ, RVQ, or for all three print only when the features are equipped and activated.

Table 42
TFN002 Network Class of Service measurements report format

Format							
System ID		TFN002					
Customer number							
NCOS	network class of service group	calls attempted	routing requests served without delay	expensive route acceptances	network call standard blocking	not defined	calls refusing expensive routes
	OHQ	OHQ calls	average time in OHQ				
	CBQ	CBQ calls	average time in CBQ				
	RVQ	RVQ calls	average time in RVQ				
Example							
0423		TFN002					
00							
NCOS	000	00207	00197	00000	00001	00000	00000
	OHQ	00007	00237				
	CBQ	00000	00000				
	RVQ	00000	00000				

TFN003 incoming trunk group measurements

These measurements provide an indication of the incremental traffic that network queuing features impose on incoming trunk groups.

Network queuing

Data accumulates for each incoming or two-way trunk group offered Off Hook Queuing (OHQ), Coordinated Call Back Queuing (CCBQ), or Call Back Queuing to Conventional Mains (CBQCM). These measurements are available at both the node and main switches. See Table 43 on page 142 for TFN003 report format.

Quantity of calls placed in OHQ

This measurement identifies the number of incoming trunk calls placed in the OHQ for possible connection to another trunk group.

Average time in OHQ

This measurement reflects the average time (in units of 0.1 second) that calls waited in the OHQ for a trunk to become available. The average time includes calls removed from the OHQ by caller abandonment or removed from the queue after expiration of the OHQ time limit.

Quantity of incoming calls offered CCBQ or CBQCM

This measurement identifies the number of blocked incoming trunk calls that were offered a node-initiated call back. The measurement tracks users at an Electronic Switched Network (ESN) main (Coordinated Call Back Queuing) or conventional main (Call Back Queuing for Conventional Mains).

Quantity of calls accepting CCBQ or CBQCM

This measurement identifies the number of blocked incoming trunk calls that accepted a node-initiated call back. The measurement tracks users at an ESN main or conventional main.

Average time in CBQ

This measurement (in 0.1 seconds) reflects the average time that main or conventional main users remained in the CBQ at the ESN node for an available facility.

When a CCBQ call back is offered to a busy station at the main, the call is removed from the queue for 5 minutes, then reinserted in the same place in the queue. This process occurs only once. The additional queuing time is included in the computation of average time. The 5-minute suspension time is not included, and reinsertion into the queue does not count as an additional CBQ call.

When a conventional main station is too busy or fails to answer a CBQCM call back, the call is removed from the queue and reinserted into the queue as specified in the preceding paragraph.

Quantity of calls blocked in call back

This measurement identifies the number of node-initiated CBQ call backs (CCBQ or CBQCM) that could not be completed because an outgoing trunk group to the main or conventional main was not available.

Call back attempts no answer and cancellation

This measurement identifies the number of call back attempts that failed because the caller did not answer the call back. CBQ call backs to a main station that previously canceled CBQ are treated as unanswered call back attempts.

Quantity of incoming calls offered RVQ or RVQCM

This measurement identifies the number of blocked incoming trunk calls that were given the option of accepting a call back. Calls from an ISDN main (Remote Virtual Queuing) or conventional main (Remote Virtual Queuing for Conventional Mains) are included in this measurement.

Quantity of calls accepting RVQ or RVQCM

This measurement identifies the number of blocked incoming trunk calls that accepted an RVQ offer. The count includes RVQ acceptances by users at the ISDN main or conventional main.

Average time in RVQ

This measurement (in units of 0.1 second) reflects the average time that users at an ISDN main or conventional main remained in the RVQ at the ISDN node for a facility to become available.

Quantity of RVQ calls blocked in call back

This measurement identifies the number of node-initiated RVQ call backs (RVQ or RVQCM) that could not be completed because no outgoing trunk group to the ISDN main or conventional main was available.

RVQ call back attempts no answer and cancellation

This measurement identifies the number of call back attempts that failed because the caller did not respond. RVQ call backs to a station at an ISDN main that has previously canceled RVQ are treated as call back attempts not answered.

> ***Note:*** Statistics for OHQ, CBQ, RVQ, or all three print out only when the features are equipped and activated.

Table 43
TFN003 Incoming Trunk Group report format

Format						
System ID		TFN003				
Customer number						
TRKG	incoming trunk group					
	OHQ	calls placed in OHQ	average time in OHQ			
	CBQ	incoming calls offered CBQ, CCBQ, CBQCM	calls accepting CBQ, CCBQ, CBQCM	average time in CBQ, CCBQ, CBQCM	blocked CBQ, CCBQ, CBQCM call backs	call back attempts not answered or canceled
	RVQ	incoming calls offered RVQ, RVQCM	calls accepting RVQ, RVQCM	average time in RVQ, RVQCM	blocked RVQ, RVQCM call backs	call back attempts not answered or canceled
Example						
0423		TFN003				
000						
TRKG	003					
	OHQ	00006	00263			
	CBQ	00000	00000	00000	00000	00000
	RVQ	00000	00000	00000	00000	00000

TFN101 OHQ overflow threshold

This threshold measurement indicates that an abnormally large number of users are timing out in the OHQ because the OHQ time limit, defined in LD 16, has expired before a trunk is available. This overflow results from trunks being out of service, incorrectly defined OHQ time limits, or temporary traffic overload.

Off Hook Queuing Timer (OHQT)

The OHQT report (see Table 44 on page 143) shows the percentage of OHQ calls that timed out (overflowed) in the OHQ before an available trunk was found. This value (in units of 0.1 percent) represents the total number of OHQ overflow, divided by the total number of OHQ offers, plus the OHQ overflows. It also shows the threshold defined (in LD 16).

Table 44
TFN101 OHQ overflow threshold violation report format

Format	
System ID	TFN101
Customer number	
OHQT timed out OHQ calls	threshold
Example	
0423	TFN101
000	
00333	00000

Traffic (LD 02)

Contents

This section contains information on the following topics:

Introduction

This section discusses traffic commands and traffic measurements.

How to use traffic commands

LD 02 sets traffic options, system ID, and time and date. The following conventions help describe the traffic commands in this section.

- user entered data is shown in 'UPPER CASE'
- system output data is shown in 'lower case'
- a period (.) prompt indicates the system is ready to receive a new command
- a double dash (– –) indicates the system is ready to receive data
- a <cr> means that the user should press the Return/Enter key

Traffic report format

The beginning of a traffic report is labelled with the header message **TFS000** followed by the date and time. The end of the traffic report is labelled with a footer message **TFS999**.

Be sure the traffic report shows both the header message and footer message as messages and threshold violations are printed at the beginning of the report.

Some of the messages or threshold violations may instruct the user to ignore the report. For example, if the system initializes, the traffic registers are cleared out. If this occurs during the traffic report period, there is no point in using the data since it is not complete.

Setting and querying daylight savings information

The daylight savings time adjustment can be programmed so that it occurs automatically on the desired dates. The system clock must have already been set. Table 45 shows the daylight savings commands.

Table 45
Daylight savings commands

Command	Description and Format
FWTM BWTM	Sets the date and time for the clock changes (FWTM = spring; BWTM = fall)
SDST	Enables or disables the automatic change feature
TDST	Queries the information using the following formats (variables are shown in brackets) FWTM <month> <week> <day> <hour> BWTM <month> <week> <day> <hour> SDST ON (OFF) TDST

The month and day of week can be entered as numerics or abbreviations as shown below. The possible variable values (defaults in parentheses) are shown as follows:

month = 1–12 or JAN–DEC
where 1 = January and 12 = December;
4 or APR is FWTM default; 10 or OCT is BWTM default

week = 1–5, L
where 1 = the first week and L = the last week of the month;
1 is FWTM default; L is BWTM default

day = (1)–7 or (SUN)–SAT
where 1 = Sunday and 7 = Saturday

hour = 0–(2)–23
where 0 = midnight and 23 = 11 p.m.

Examples of each daylight savings command are shown in Table 46.

Table 46
Examples of each command

Example	Command
Set daylight savings time in the spring	FWTM 4 1 1 2 or FWTM APR 1 SUN 2
Return to regular time in the fall	BWTM 10 4 1 2
Turn on the automatic feature	SDST ON
Query the settings	TDST

Daylight savings information set by these commands survive sysload.

Set traffic report schedules

The following commands are used to set traffic report schedules.

Print current customer report schedule
TSHC C sd sm ed em
sh eh so
d d …

Print current system report schedule
TSHS sd sm ed em
sh eh so
d d …

Set customer report schedule
SSHC C sd sm ed em -- SD SM ED EM
sh eh so -- SH EH SO
d d …—D D …<cr>

Set system report schedule
SSHS sd sm ed em -- SD SM ED EM
sh eh so -- SH EH SO
d d …—D D …<cr>

The following legend applies to format fields used when configuring the customer and system traffic report schedule. Possible variable values appear in parentheses:

C = customer number (always input a space before and after the customer number)
D = day of the week:
- 1 = Sunday
- 2 = Monday
- 3 = Tuesday
- 4 = Wednesday
- 5 = Thursday
- 6 = Friday
- 7 = Saturday

ED = end day (1–31)
EH = end hour (0–23)
EM = end month (1–12)
SD = start day (1–31)
SH = start hour (0–23)
SM = start month (1–12)
SO = schedule options:
- 0 = no traffic scheduled
- 1 = hourly on the hour
- 2 = hourly on the half hour
- 3 = every half hour

Example
To set the system report schedule:
SSHS 25 4 16 7 -- 1 10 1 12
12 21 2 -- 0 23 3
2 3 4 5 6 -- 1 7<cr>

An explanation of the example on page 149:

Old schedule	**New schedule**
start time: April 25 at 12 noon end time: July 16 at 9 P.M. frequency: hourly on the half hour (SO = 2) days of the week: Monday to Friday	start time: October 1 at 12 midnight end time: December 1 at 11 P.M. frequency: every half hour (SO = 3) days of the week: Saturday and Sunday

Note 1: To obtain traffic reports at the scheduled intervals, the output device must have prompt USER = TRF in LD 17: Configuration Record 1. If TRF is not defined for any device, reports are still generated.

Note 2: Start and end times on the half hour are not supported. Use full-hour only (use 23, do not use 23 30). Output every half hour is supported, however, using SO=3.

Set system ID

Each system has a unique System ID number (SID) of up to four digits. The ID number can be printed or set by the following commands.

Print the current SID
TSID sid

Change the SID
SSID sid -- SID

System reports

Print the current report types
TOPS r r …

Set one or more report types
SOPS r r … -- R R …<cr>

Clear one or more report types
COPS r r … -- R R …<cr>

R = traffic report type:
- 1 = networks
- 2 = service loops
- 3 = dial tone delay
- 4 = processor load
- 5 = measurement on selected terminals
- 7 = junctor group traffic
- 8 = CSL and AML links
- 9 = D-channel
- 10 = ISDN GF Transport
- 11 = MISP traffic
- 12 = MISP D-channel management
- 13 = MISP messaging
- 14 = ISDN BRI trunk DSL system report
- 15 = MPH traffic

To use the print command, enter a space (not a carriage return) after the customer number. If no reports are currently set, the system outputs NIL.

Set system thresholds

The system thresholds (TH) and range of values (TV) appear as percentages or CCS:

Print the current system thresholds
TTHS TH tv

Set the system thresholds
STHS TH tv -- TV

- 1 = dial tone speed (range 00.0% to 99.9%)
- 2 = loop traffic (range 000 to 999 CCS)
- 3 = junctor group traffic (range 0000 to 9999 CCS)
- 4 = superloop traffic (range 0000 to 9999 CCS)
- 5 = zone bandwidth (range 00.0% to 99.9%)

Thresholds and range of values for customer appear as percentages or seconds.

Customer reports

Print the current report types
TOPC C r r …

Set one or more report types
SOPC C r r … -- R R …<cr>

Clear one or more report types
COPC C r r … -- R R …<cr>

C = customer number – always input a space before and after the customer number.
R = traffic report type:

- 1 = networks
- 2 = trunks
- 3 = customer console measurements
- 4 = individual console measurement
- 5 = feature key usage
- 6 = Radio Paging
- 7 = Call Park
- 8 = messaging and Auxiliary Processor links
- 9 = Network Attendant Service
- 10 = ISPC links establishment
- 11 = use of broadcasting routes

To use the print command, enter a space (not a carriage return) after the customer number.

If no reports are set, the system outputs NIL. For TFC005, see “Set customer for feature key usage measurement” on page 154.

Set customer thresholds

Print the current customer thresholds
TTHC C TH tv

Set the customer thresholds
STHC C TH tv -- TV

1= incoming matching loss (TV range 00.0% to 99.9%)
2 = outgoing matching loss (TV range 00.0% to 99.9%)
3 = average Speed of Answer (TV range 00.0 to 99.9 seconds)
4 = percent All Trunks Busy (TV range 00.0% to 99.9%)
5 = percent OHQ overflow (TV range 00.0% to 99.9%)

Network reports

Print the current report types
TOPN C r r …

Set one or more report types
SOPN C r r … -- R R …<cr>

Clear one or more report types
COPN C r r … -- R R …<cr>

C = customer number – always input a space before and after the customer number
R = traffic report type:
1 = route list measurements
2 = network class of service measurements
3 = incoming trunk group measurements

To use the print command, enter a space (not a carriage return) after the customer number.

If no reports are currently set, NIL is output by the system.

Set customer for feature key usage measurement

Print current customer being measured
TCFT c

Set the customer to be measured
SCFT c -- C

C refers to the customer number. Only one customer can have feature measurement set at a time.

Stop printing title, date, and time

Suppress the printing of the title (TFS000), date, and time in cases where traffic measurement is scheduled but no other data is printed by issuing the following command:

Stop printing
IDLT 0

Start printing
IDLT 1

0 = no title is printed unless further data is also printed
1 = the title is always printed

Set traffic measurement on selected terminals

These commands print, set, and clear the Individual Traffic Measurement (ITM) class of service for specific terminals, trunks, and DTI channels in traffic report TFS005.

> ***Note:*** Do not use these commands on superloops or octal density cards: NT8D02, NT8D03, NT8D09, NT8D14, or NT8D16.

Print the current TNs with ITM set
TITM

Example

TITM	prints current settings
shelf 4 0	all units on loop 4 shelf 0 have ITM set
loop 5	all units on loop 5 have ITM set
tn 11 3 4 1	unit on TN 11 3 4 1 has ITM set
card 13 2 1	all units on card 13 2 1 have ITM set
chnl 15 21	loop 15 channel 21 has ITM set

Set ITM on terminals:
SITM

Example

SITM	prints current settings)
shelf 4 1	all units on loop 4 shelf 1have ITM set
loop 05	all units on loop 5 have ITM set
tn 11 3 4 1	unit on TN 11 3 4 1 has ITM set
card 13 1 1	all units on card 13 2 1 have ITM set
chnl 34 18	loop 34 channel 18 has ITM set
- - 7	set ITM on all units on this loop
- - 6 1	set ITM on all units on this shelf, or on channel 1
- - 8 1 1	set ITM on all units on this card
- - 8 1 1 1	set ITM on this unit
- - 34 18	set ITM on loop 34 channel 18
- - <cr>	stop “--” prompt

Clear line traffic TNs:
CITM

Example

CITM	prints current settings
shelf 4 1	all units on loop 4 shelf 1have ITM set
loop 05	all units on loop 5 have ITM set
tn 11 3 4 1	unit on TN 11 3 4 1 has ITM set
card 13 1 1	all units on card 13 2 1 have ITM set
chnl 34 18	loop 34 channel 18 has ITM set
- - 4 1	clear ITM on all units on this loop 4 shelf 1
- - 5	clear ITM on all units on this loop
- - 11 3 4 1	clear ITM on this unit
- - 19 1 1	clear ITM on all units on this card
- - 34 18	clear ITM on loop 34 channel 18
- - <cr>	stop "--" prompt

Set blocking probability for Line Load Control (LLC)

Print current LLC level and blocking probability
TLLC

Set blocking probability
SCTL x aaa

Activate Line Load Control at level x
SLLC x

x = 1, 2, or 3 LLC level
aaa = blocking probability in percent (%)

Set time and date

Print the current time and date
TTAD day-of-week day month year hour minute second

Example
TTAD WED 24 11 1976 15 41 49

Set the time and date
STAD Day Month Year Hour Minute Second

Example
STAD 24 11 1976 15 41 49

All entries in the time-of-day output, except the year, are two-digit numbers. The year, which can be any year from 1901 to 2099 inclusive, is input as a full four-digit field (for any year between 1901 and 2099 inclusive) or in a two-digit short form (for years between 1976 and 2075).

Also see “Setting and querying daylight savings information” on page 147.

Set daily time adjustment

The time of day can be adjusted during the midnight routines to compensate for a fast or slow system clock.

Print the current adjustment
TDTA x y

Set the adjustment
SDTA x y -- X Y

x = 0 for negative increment
  = 1 for positive increment
y = 0–60 second adjustment in increments of 100 ms

Set network time synchronization

A number of parameters can be adjusted for the Network Time Synchronization feature.

Print the current node status
TTSS

Set the node status
STSS <STATUS>

where <STATUS> may be:
(STDA) = stand-alone
MAST = Master
SLAV = Slave

Print the customer assigned to feature
TTSC

Set the customer assigned to feature
STSS C

where C is:
(0) - 99 = Customer Number for Large Systems
(0) - 31 = Customer Number for Small Systems and Succession 1000 Systems.

Print the Local Virtual DN
TLDN

Set the Local Virtual DN
SLDN <DN>

where:
<DN> = Directory Number

Print the Master/Backup Time Synchronization Number
TMDN

Set the Master/Backup Time Synchronization Number
SMDN <DN>

where:
<DN> = Directory Number

Print Time Delta
TDEL

Set Time Delta
SDEL <SIGN><HR><MIN>

where:
<SIGN> is the time adjust factor direction indicator which may be:
0 = to indicate the Master switch is behind in time
1 = to indicate the Master switch is ahead in time.
<HR> = number of hours the time must be adjusted by 0 - 23.
<MIN> = number of minutes the time must be adjusted by 0 - 59.

Print Requesting Mode
TMOD

Set Requesting Mode
SMOD <MODE>

where <MODE> may be:
(BKGD) = Background
DVSC = Daily Service Routines

Print last reports

The last traffic reports can be printed or tested against threshold values. Data accumulating for the next reports is not accessible.

Print one or more of the last customer reports
INVC C R R …

For printing the last customer report:

C = customer number (always input a space before and after the customer number)
R = traffic report type:
- 1 = networks
- 2 = trunks
- 3 = customer console measurements
- 4 = individual console measurement
- 5 = feature key usage
- 6 = Radio Paging
- 7 = Call Park
- 8 = messaging and Auxiliary Processor links
- 9 = Network Attendant Service

Print one or more of the last network reports
INVN C R R …

C = customer number
R = traffic report type:
- 1 = route list measurements
- 2 = network class of service measurements
- 3 = incoming trunk group measurements

Print one or more of last system reports
INVS R R …

R = traffic report type:
- 1 = networks (per loop)
- 2 = services
- 3 = dial tone delay
- 4 = processor load
- 5 = selected terminals
- 7 = junctor group traffic
- 8 = CSL and AML links
- 9 = D-channel

Perform threshold tests on last reports

Perform threshold tests on customer reports
ITHC C TH

C = customer number
TH = threshold type:
- 1 = incoming matching loss
- 2 = outgoing matching loss
- 3 = average Speed of Answer
- 4 = percent All Trunks Busy
- 5 = percent OHQ overflow

Perform threshold tests on system reports
ITHS TH

TH = threshold type:
- 1 = dial tone speed
- 2 = loop traffic
- 3 = junctor group traffic
- 4 = superloop traffic

Note: When a threshold test passes, “OK” is output.

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Meridian 1, Succession 1000,
Succession 1000M

Traffic Measurement

Formats and Output

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