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DMS-100 Family

TOPS MPX NT DA

Force Management Guide

BCS35 and up   Standard 02.01   January 1994

northern telecom

DMS-100 Family

TOPS MPX NT DA
Force Management Guide

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About this document

This document defines force management, describes the typical force management office configuration, and explains how the DMS distributes calls. It also explains force management measurements, features, positions, reports, and forms.

When to use this document

Northern Telecom (NT) software releases are referred to as batch change supplements (BCS) and are identified by a number, for example, BCS29. This document is written for DMS-100 Family offices that have BCS35 and up.

More than one version of this document may exist. The version and issue are indicated throughout the document, for example, 01.01. The first two digits increase by one each time the document content is changed to support new BCS-related developments. For example, the first release of a document is 01.01, and the next release of the document in a subsequent BCS is 02.01. The second two digits increase by one each time a document is revised and rereleased for the same BCS.

To determine which version of this document applies to the BCS in your office, check the release information in *DMS-100 Family Guide to Northern Telecom Publications*, 297-1001-001.

How to identify the software in your office

The *Office Feature Record* (D190) identifies the current BCS level and the NT feature packages in your switch. You can list a specific feature package or patch on the MAP (maintenance and administration position) terminal by typing

>PATCHER;INFORM LIST identifier
and pressing the Enter key.

where
identifier   is the number of the feature package or patch ID

You can identify your current BCS level and print a list of all the feature packages and patches in your switch by performing the following steps. First, direct the terminal response to the desired printer by typing

>SEND printer_id
and pressing the Enter key.

where
printer_id   is the number of the printer where you want to print the data

Then, print the desired information by typing

>PATCHER;INFORM LIST;LEAVE
and pressing the Enter key.

Finally, redirect the display back to the terminal by typing

>SEND PREVIOUS
and pressing the Enter key.

How TOPS MPX NT DA documentation is organized

This document is part of TOPS MPX NT DA documentation that supports the Northern Telecom line of TOPS MPX NT DA products. TOPS MPX NT DA documentation is a subset of the DMS-100 Family library.

The DMS-100 Family library is structured in numbered layers, and each layer is associated with an NT product. To understand TOPS MPX NT DA products, you need documents from the following layers:

- DMS-100 Family basic documents in the 297-1001 layer
- TOPS MPX NT DA documents in the 297-2291 layer

TOPS MPX NT DA documents and other documents that contain related information are listed in "Finding TOPS MPX NT DA information" in *TOPS MPX NT DA Product Guide*, *297-2291-010.*

References in this document

The following documents are referred to in this document.

Number	Title
297-1001-160	*AMA Bellcore Format User Guide*
297-1001-830	*AMA Bellcore Format Reference Manual*
297-2291-350	*TOPS Translations Guide*
297-2291-451	*TOPS Customer Data Schema*
297-2291-454	*TOPS Customer Data Schema Input Forms*
297-1001-455	*Office Parameters Reference Manual*
297-2291-154	*TOPS MPX NT DA Planning and Engineering Guide*

How commands, parameters, and responses are represented

Commands, parameters, and responses in this document conform to the following conventions.

Input prompt (>)

An input prompt (>) indicates that the information that follows it is a command:

> **>BSY**

Commands and fixed parameters

Commands and fixed parameters that are entered at a MAP are shown in uppercase letters:

> **>BSY LINK**

Variables

Variables are shown in lowercase letters:

>BSY LINK ps_link

The letters or numbers that the variable represents must be entered. Each variable is explained in a list that follows the command string.

Responses

Responses correspond to the screen display and are shown in a different type:

```
Any active calls may be lost
Please confirm ("YES" or "NO"):
```

What is force management?

In a call distribution system, the operators who handle calls make up the work force. The term *force management* refers to the functions and responsibilities of managing an operator work force. Effective force management ensures that enough operators are available to handle call traffic for every quarter hour of every day throughout the year. In addition, force management involves monitoring the quality of service provided, including the speed with which calls are answered.

The Traffic Operator Position System (TOPS) MPX uses an electronic call processor with internal counting and scanning abilities. This provides the force management statistics that a force supervisor uses to determine how many operators are needed and to monitor the quality of service.

Force management statistics are sent to a teletypewriter (TTY) or an off-board computer. They include information such as the number of calls handled for a given period of time, the types of calls received, and the usage measurements expressed in hundred call seconds (CCS). These statistics are explained in this guide.

An operator work force may be organized into single or multiple offices (known as *single-traffic* and *multitraffic* offices). The configuration depends on the size of the operator work force and the geographic distribution of the operating company's serving area. The office organization is based strictly on the operating company's decisions, not on any requirements imposed by TOPS MPX software. The configuration of the office, however, may cause slight differences in the TOPS MPX functions available. Throughout this document, any feature available only in a certain configuration is noted; otherwise, features are available in both single-traffic and multitraffic office configurations. For further information on office configurations, see Chapter 2, "Work force office configurations."

The force management hierarchy

At the top of the hierarchy, a force supervisor is responsible for high-level decision making and control of the software features that affect the TOPS MPX work force as a whole. The force supervisor typically does not focus on the performance of individual operators, but instead monitors the relative performance of teams of operators grouped in separate traffic

offices. These traffic offices may be geographically distant from the central Digital Multiplex System (DMS) office. The TOPS MPX system supports up to 30 traffic offices.

At the level below force supervisor is the in-charge (IC) manager of each individual traffic office. A specific traffic office may contain any number of operators, but usually contains about 30. The size of the traffic office is determined by the type of calls handled, the complexity of the operator's job, the amount of assistance normally required from management, and the administrative costs. The IC manager is responsible for the efficiency of one particular group of operators and has control of features that affect that particular office. Therefore, IC managers are concerned with information about individual operators. The IC manager uses a TOPS MPX in-charge position to help operators requiring assistance, to monitor and page operators, and to see the status of the traffic office displayed in real time. Each TOPS MPX traffic office supports one IC position.

Between the IC manager and the operators there may be a number of service assistants, whose main task is to assist operators as needed. Service assistants use TOPS MPX service assistance (SA) positions to help operators handle calls and to monitor and page operators. SA positions also reflect certain events taking place in the traffic office (for example, calls being deflected or the calls-waiting value exceeding a specified threshold). There can be up to 126 assistance positions in a TOPS MPX system. The effective limit is determined by the telephone administration through an office parameter.

The force management objective

The basic objective of force management is to provide subscribers with consistently prompt operator service by managing the following factors:

- offered load
- number of operators
- speed of answer
- average work time

Offered load

Offered load is the number of people waiting for operator service at a given time. Offered load is always tied to a specific time.

Calls occupy operators for an interval of time, making them unavailable to handle new calls. This busy time, called *work volume*, is the number of incoming calls (the offered load) multiplied by the time taken to handle each call.

In the TOPS automatic call distribution (ACD) environment, work volume is accumulated in seconds and usually expressed in hundred call seconds

(CCS). For example, one half-hour period is 18 CCS. There are 30 minutes in one half hour and 60 seconds in each minute. Multiplying 30 by 60 results in 1800 seconds. Dividing that product by 100 produces 18 CCS per half hour.

In the TOPS Queue Management System (QMS) environment, work volume is measured in tenths of seconds and reported in seconds.

Number of operators

The number of operators needed depends on two factors:

- the amount of operator time required to handle the work volume
- the amount of additional operator time, known as *ready-to-serve time*, required to answer calls as quickly as planned

Speed of answer

Speed of answer (ANS) is the average number of seconds subscribers must wait for the operator to answer. The operating company's general goal of a consistently prompt ANS must be translated into precise objectives for discrete time periods, such as quarter hours and half hours. For example, an aimed-for speed of answer might be an average of 2.1 seconds.

> *Note:* When the system is overloaded (meaning a five-percent increase in the offered load), the average speed of answer should not exceed 10 seconds.

Average work time

Average work time (AWT) is the average time it takes an operator to process one call. AWT has a direct effect on the cost of handling customer calls, and it also helps determine the required number of operators.

The shorter the AWT, the more often each operator becomes available to handle a new call. For example, to handle a given offered load (such as 500 work-volume CCS), an AWT of 65 seconds requires one more operator than an AWT of 40 seconds (assuming the ANS objectives are the same).

Work force office configurations

A force administration system is made up of a DMS switch and all the positions it serves. Within that system, a traffic office is a group of related operator positions for which separate administrative data is provided.

An entire work force contained in one location constitutes a single-traffic office. A work force divided into geographically separate groups constitutes a multitraffic office. This chapter describes the equipment used in each type of office configuration.

> *Note:* An operating company that has the Queue Management System (QMS) in addition to TOPS automatic call distribution (ACD) will have a QMFADS TTY in addition to the MFADS TTY and a QFADS TTY in addition to the FADS TTY.
>
> Any team that has QMS will have a QFADS TTY *instead* of a FADS TTY and a QTADS TTY instead of the TADS TTY. (There is no QSADS TTY.) These devices are physically identical to their non-QMS counterparts, but they are designated by different names in datafill. Their software is similar, but the commands differ from non-QMS ACD commands. For more information about QMS devices, see Chapter 9, "QMS TTY commands, queries, and reports."

Single-traffic office configuration

In a single-traffic office configuration, operators and force administration personnel are all located in the same group or office. Refer to Figure 2-1 for an illustration.

The minimal equipment normally found in a single-traffic office in a TOPS ACD environment includes the following:

- in-charge (IC) position
- service assistance (SA) positions
- operator positions
- system administration data system teletypewriter (SADS TTY)

Other optional equipment may be found in a single-traffic office, depending on the services the office provides. For specific information on the kinds of equipment available, refer to Table 2-4 on page 2-7.

Figure 2-1
Sample single-traffic office configuration

Single-traffic office configuration

IC position, SADS

(IC manager with force
management capabilities)

(clerk). . . . . .(clerk)

SA positions

(Service assistants with
delegated force management functions)

Operator positions

(operators)

Notes: 1. The number of clerks required depends on work load.
2. Up to 126 SA/IC positions can be datafilled for the traffic office. (The system maximum is 126 SA/IC positions, so if 126 are datafilled for one traffic office, none can be datafilled for any other traffic office.)
3. Up to 1023 operator positions can be datafilled in Table TOPSPOS, depending on how heavily the DMS is loaded.

Multitraffic office configuration

In a multitraffic office configuration, the operator work force is divided administratively into different groups or offices, and these offices are generally located in different geographical areas. Each individual office is referred to as a *traffic office*. Figure 2-2 illustrates a sample configuration for a multitraffic office.

The minimal equipment normally found in a multitraffic office in a TOPS ACD environment includes the following:

- force management cathode-ray tube (FMCRT)
- IC position
- SA positions
- operator positions

- force administration data system teletypewriter (FADS TTY)
- traffic administration data system teletypewriter (TADS TTY)

Other types of equipment may be located in the multitraffic office, such as the mechanized force administration data system (MFADS), which is discussed in Chapter 7, "Mechanized force administration data system."

Figure 2-2
Sample configuration of a multitraffic office


```
Force management center

          FMCRT FADS, MFADS
            (Force supervisor)
      Force administrators and clerks

        1 . . . . . . . . . . . . . . . . . . . . . . . . . 30

   TADS TTY                        TADS TTY

   IC position                     IC position
   (IC manager)                    (IC manager)

   1 - 6 SA positions              1 - 6 SA positions
   (Service assistants)            (Service assistants)
   Operator positions 1 - 99       Operator positions 200 - 250
   (operators)                     (operators)

   Traffic office 1                Traffic office 30
```

Notes: 1. A force management center can cover up to 30 traffic offices. In this example, operator positions 100 through 199 are accounted for in traffic offices 2 through 29.

2. Up to 126 SA/IC positions can be datafilled for the traffic office. (The system maximum is 126 SA/IC positions, so if 126 are datafilled for one traffic office, none can be datafilled for any other traffic office.)

3. The number of force clerks per traffic office depends on work load.

4. Up to 1023 operator positions can be datafilled in Table TOPSPOS, depending on how heavily the DMS is loaded.

There are some functional differences between single-traffic and multitraffic offices, depending on the office configuration. For example, in a multitraffic office, the force supervisor must be able to poll each individual office; this capability is not required in a single-traffic office. In a multitraffic configuration, statistics must be attributed to a given traffic office. Such differences are indicated in this document where appropriate.

Equipment

Table 2-1 describes the equipment found in both single-and multitraffic office configurations in a TOPS ACD environment.

Table 2-1xxx Equipment found in both single- and multitraffic office systems	
Equipment	**Definition**
Operator position	A cathode-ray tube (crt) and keyboard located in the traffic office and used by the operator to handle calls
SA position	A crt and keyboard at which the service assistant can be reached for help and which can be used to monitor operators, page, place outgoing calls, and perform administrative searches
IC position	A crt and keyboard located in the traffic office (usually near the SADS TTY or, in a multitraffic office, near the TADS TTY) and used by the IC manager. The IC position displays office statistics and can receive assistance requests. The IC manager can use it to monitor operators, page, place outgoing calls, and perform administrative searches.
Autoquote (AQ) TTY	A teletypewriter located on the premises of a hotel or attended pay station (APS). As soon as a guest's call terminates, all call details are directly transmitted to the AQ TTY. There can be only one receive-only TTY per hotel and a maximum of 512 per TOPS MPX.
Voicequote (VQ) TTY	A teletypewriter located in the hotel billing information center (HOBIC). If there is no AQ TTY on the premises, the operator telephones the hotel or APS as soon as the guest's call terminates and verbally quotes the call details, including billing information. There can be one or two VQ TTYs in a TOPS MPX configuration.
Record (REC) TTY	A receive-only TTY located in the HOBIC. It receives a duplicate copy of messages sent to AQ and VQ TTYs and charge-adjust messages sent to the HADS TTY. It also receives all other charge-adjust messages. The TTY alarm messages and measurements are not duplicated on the REC TTY.

Table 2-2 lists additional equipment found in a single-traffic office in a TOPS ACD environment.

Table 2-2xxx
Additional equipment found in a single-traffic office configuration

Equipment	Definition
SADS TTY	A teletypewriter used by the IC manager to activate and deactivate force management features and to print information about the system. The SADS TTY has the combined facilities of the TADS and FADS TTYs, which are used in multitraffic offices.
Hotel administration data system (HADS) TTY	A send/receive teletypewriter located in the HOBIC. The operator uses this device to enter TOPS MPX billing information to be sent to the AQ, VQ, and REC TTY. HOBIC personnel also use it to place an AQ, VQ, and REC TTY in or out of service. In addition, the HADS TTY receives TTY service alarm messages, HOBIC operational measurement information, and hotel charge-adjust (credit) messages generated by TOPS MPX operators.

Table 2-3 lists additional equipment found in a multitraffic office in a TOPS ACD environment.

Table 2-3xxx
Additional equipment found in a multitraffic office configuration

Equipment	Definition
FMCRT	A specially configured TOPS 04 or TOPS MP position that is located in the force management center and used to display force management statistics
Force administration data system (FADS) TTY	A teletypewriter located in the force management center that is used to activate and deactivate force management features and to print information about the system and the various traffic offices. The FADS TTY manages the system as a whole. Every 30 minutes (or 15 minutes, if requested), it provides hardcopy reports of system-wide performance. Summaries are also provided on a 6-hour and 24-hour basis. The FADS TTY allows the force supervisor to display and modify system information without having to refer to individual operators. The force supervisor can also use it to - obtain information about call queue threshold tables used by the TOPS MPX call distribution system - control the way these queue thresholds are selected - control the number and type of periodic management reports printed - obtain information on the number of operators assigned to the study register data system - change the number of registers allocated to a particular traffic office - control call transfers
TADS TTY	A teletypewriter used in individual traffic offices to activate and deactivate force management features and to print system information for specific traffic offices. There is one TADS TTY per traffic office. The TADS TTY provides periodic statistical reports for the same sample periods as the FADS, but it provides data for only one traffic office. Through the TADS TTY, operators are given controlled traffic call sets and assigned to the study register system.
Force management center (FMC)	A centralized location staffed with people who carry out administration tasks for the entire operator work force (not for individual traffic offices)

The keyboard send/receive SADS, TADS, and FADS TTYs are equipped with a standard QWERTY keyboard. They are used to enter commands or queries into the DMS, which uses the printer to confirm these entries or to provide the requested information. The DMS transmits measurement statistics to the TTY at a rate of 300 baud transmit and 1200 baud receive. The speed is assigned by the customer in Table TOPSDEV.

Office provisioning

Table 2-4 provides a list of all of the equipment that can be found in each office type.

Table 2-4xxx **Equipment provisioning**			
Single	**Multi**	**Equipment**	**Requirement**
√	√	Operator position	1023 per TOPS MPX host (varies depending on real-time considerations)
√	√	SA position	0 to 125 per office
√	√	IC position	1 per office
√	√	AQ TTY	1 per hotel, maximum of 512 per TOPS MPX host
√	√	VQ TTY	2 (includes optional backup TTY)
√	√	REC TTY	2 (includes optional backup TTY)
√	√	HADS TTY	1 per TOPS MPX host
	√	TADS TTY	1 per office, maximum of 30 per TOPS MPX host
	√	FADS TTY	1 per TOPS MPX host
√		SADS TTY	1 per TOPS MPX host
	√	FM CRT	1 per TOPS MPX host
√	√	MFADS	1 per TOPS MPX host
√	√	NOTIS	1 per TOPS MPX host

Enhanced MFADS impact on office configurations

If the enhanced MFADS feature is implemented, it is compatible with current MFADS configuration guidelines and does not add any new requirements. However, the following restrictions and limitations apply to operator centralization (OC) office configurations:

- In OC configurations, the enhanced MFADS feature is installed only in the host.

- Both the host and the remotes for OC configurations should be upgraded to BCS 31 or later. If the enhanced MFADS feature is installed in a host without a corresponding upgrade of the remotes, queue measurements will be accurate, but service measurements will be unpredictable and unreliable.

- Only the host in OC configurations has access to the new parameters added by the enhanced MFADS feature.

Understanding how the DMS distributes calls

This chapter explains how the DMS switch distributes calls to operator positions. The first section describes the TOPS automatic call distribution (ACD) system. Subsequent sections explain how calls-waiting (CW) queues are serviced and how CW queue thresholds are set; features affecting call distribution are also identified.

A section at the end of this chapter explains how the DMS distributes calls using the Queue Management System (QMS).

TOPS ACD call distribution

TOPS MPX uses queues to manage calls requiring operator assistance. Two queues are used for position management, and eight are used to distribute incoming calls. Incoming calls are generally placed in queue and distributed on a first-in, first-out (FIFO) basis. They are routed to any occupied but idle operator position. The two position management queues are referred to as *idle position queues.* They allow the DMS to route an incoming call to the most idle TOPS MPX operator position.

The eight queues for distributing incoming calls are classified as CW queues and are separated into the following four categories:

- general (GEN)
- transfer 1 (XFR1)
- transfer 2 (XFR2)
- directory assistance (DA), also called transfer 3 (XFR3)

Note: The terms *transfer 3*, *XFR3*, and *XFR DA* are used interchangeably throughout this document. They all mean the same thing. Most of the customer data tables refer to this queue as XFR3; however, TTY periodic reports list statistics for the XFR3 queue as XFR DA statistics. The XFR3 queue is generally used for DA call management in offices that are not DA-only offices.

No restrictions prevent the operating company from queuing non-DA calls in the DA queue or from queuing DA calls in non-DA queues (GEN, XFR1,

or XFR2); however, unless the office is strictly a DA-only office, force management (FM) statistics will be skewed.

Idle position queues

TOPS MPX maintains two queues to track all operator positions with available loops. (A loop is one of two lines that connect calls to a TOPS MPX position.) One queue tracks the number of positions that have both loop1 and loop2 available. The other queue tracks the number of positions that have only one loop available. When possible, incoming calls are routed to positions that have both loops available.

TOPS MPX searches the queues for the most idle position and connects the call to that position. If no position has a loop available, the TOPS system places the call in one of the CW queues.

> *Note:* There can be only one DA or intercept call at a position.

Calls-waiting queues

When the DMS detects a trunk seizure on a trunk carrying operator traffic, it searches the idle position queue for an idle operator position to which to connect the call. When an available position is found, the DMS selects a 3-port conference circuit and connects the call and operator position to that port. If no operator position is found, the DMS time-stamps the call and places it in the CW queue. When a call is placed in the CW queue, ringing is applied, and the call waits in the queue until an operator is available.

Recalls (calls that have already received operator service but require additional operator service) are handled before any other calls in the queue. Calls being handled for the first time are referred to as initial position seizures (IPS).

When an operator position becomes available, the DMS searches the CW queue and connects a call to the idle position. Recalls receive first priority (oldest recall first). Nonrecalls receive second priority (oldest call first).

When the call reaches an operator position, a call arrival tone alerts the operator, and the call information is displayed on the operator position screen. The operator uses the information displayed, along with information provided by the subscriber, to process the call.

Once the connection is made between the incoming and outgoing trunks, the operator either releases the call or uses the **SPLIT/JOIN** key. This function is similar to hold in that the subscriber remains connected to the position but cannot hear the operator until the **SPLIT/JOIN** key is pressed again to join the connection. The call remains at the position until the operator presses the **POS RLS** key. When the operator releases the call, the 3-port conference circuit is freed for another call.

When the listing is quoted and the call is released, the system generates an automatic message accounting (AMA) record for billing. For complete details on billing, refer to *AMA Bellcore Format User Guide,* 297-1001-160, and *AMA Bellcore Format Reference Manual,* 297-1001-830.

Conditions that affect call distribution

The DMS distributes calls evenly across all positions so that no position is overburdened. Calls are distributed across traffic offices as well. Separate locations and administrative entities do not affect the way calls are distributed. Certain operating conditions, including the following, do affect the distribution of calls.

System-returned calls (recalls, such as coin notify, coin overtime, noncoin notify) are distributed on a FIFO basis before any calls are distributed and thus facilitate operator recall at the prescribed time.

Calls-waiting queue servicing

The eight CW queues in a TOPS MPX office are divided into two priority levels, and all calls within a priority level are serviced on a FIFO basis.

The queues are as follows:
- first priority - recall
    - GEN
    - XFR1
    - XFR2
    - XFR DA
- second priority - nonrecall
    - GEN
    - XFR1
    - XFR2
    - XFR DA

The recall category consists of call types that have been previously connected to an operator but require additional assistance. For example, a call transferred from a GEN operator to an XFR1 or XFR2 operator is a transfer recall. An operator-handled call on which the subscriber flashes to reconnect to an operator is a general recall if the call was not originally floated as a transfer call.

> *Note:* The terms *nontransfer* and *general* are used interchangeably within TOPS MPX. They both mean that the operator will receive DA calls.

The nonrecall category consists of newly originated call service types that have not yet received operator assistance. This category includes calls

requiring general operator assistance and calls routed directly to XFR1, XFR2, or XFR3 operators.

Within these two priority levels, calls are separated into the transfer types defined in Table 3-1.

Table 3-1xxx Transfer types	
Type	**Explanation**
GEN	Calls requiring none of the special abilities of XFR1 or XFR2 operators are placed in the GEN portion of the CW queue.
XFR1	Calls requiring the special abilities of XFR1 operators are placed in the XFR1 portion of the CW queue.
XFR2	Calls requiring the special abilities of XFR2 operators are placed into the XFR2 portion of the CW queue.
XFR3 or XFR DA	Calls requiring the special abilities of XFR3 operators are placed into the XFR DA portion of the CW queue.

Each operator position, operator, and call has an associated service. Calls are stamped with the service type based on their call-origination type. The service types that the operator and position can handle are defined in datafill. The queue in which a call is placed does not determine its service type.

Enqueuing calls

Calls that have already received operator service but that require additional service are placed in one of the recall queues, depending on the transfer type of the call. When a new call arrives, it is placed in one of the nonrecall queues (GEN, XFR1, XFR2, or XFR DA), also depending on the transfer type of the call.

Dequeuing calls

Within each priority level, calls are processed on a FIFO basis, depending on the type of call the available operator can handle. For example, when a position that can service all types of calls (GEN, XFR1, XFR2, and XFR DA) becomes available, the DMS first checks the recall queues to determine which call from which queue should be serviced first. If more than one recall queue contains a call, the DMS distributes the oldest calls waiting in the four queues.

When no recalls are enqueued, the DMS continues its search of the nonrecall queue priority for a call to distribute to the idle position. When more than one nonrecall queue contains calls, the oldest call waiting in the nonrecall queue is serviced first.

Since not all positions provide all types of service, the DMS processes the oldest call within the recall queues that matches both the service type (GEN, XFR1, XFR2, or XFR DA) of an available position and the call types that the operator at that position can receive. After recalls are processed, the first call distributed is the oldest call waiting in the nonrecall queue that matches both the service type of an available position and the types of calls the operator can receive.

Queue thresholds

The office parameter TOPS_CALLS_WAITING_Q_SIZE in Table OFCENG limits the total number of calls that can be queued in TOPS MPX. If this limit is exceeded, the call is deflected for treatment.

There are also dynamically changing thresholds associated with the queuing of calls. These thresholds are controlled by the system-wide average work time (AWT) for the last 15-minute period, the number of occupied positions (with headsets seated), and the number of calls currently queued. Queue thresholds for Tables QT0-QT5 may also be controlled manually from the FADS TTY.

Thresholds for calls waiting

If the call-arrival rate exceeds the operator capacity, calls accumulate in the CW queue. As the queue becomes longer, the amount of time an incoming call waits to obtain an operator increases. Queue thresholds provide a way to limit this wait time to a maximum value for each transfer type. It is important to limit this time, since a subscriber who has been waiting in the CW queue for a long time is likely to terminate the call and try again. When a subscriber redials, the call is placed at the end of the queue.

Every fifteen minutes TOPS MPX selects a dynamically changing maximum wait time for each transfer type. Alternatively, a manager may enter commands at the TTY to manually select one of the six tables used to determine the queue threshold for a transfer type.

To implement queue thresholds, a force supervisor must estimate the amount of time a call remains in its queue before being connected to an operator. The time a call spends in its CW queue depends on the average speed of answer for calls, the capacity of the operator work force to handle calls of that transfer type, and the number of calls queued ahead of that call.

Using optional mechanized force administration data system (MFADS) statistics, TOPS MPX calculates the average work time (AWT) used in setting TOPS thresholds. The work volume is divided by the number of initial position seizures (IPS) for each queue. The IPS and call-busy work volume (CBWV) are pegged based on the destination queue type for transfers. This method results in a reduction in the IPS and CBWV for the first queue type and an increase in measurements for the second queue type.

The optional enhanced MFADS feature provides more detailed statistics. If enhanced MFADS is implemented with the parameter TOPS_PEG_MODE in Table OFCENG set to PS, position seizure measurements are used in the threshold AWT calculations instead of IPS measurements only. (Position seizure [PS] measurements include initial position seizures, transfer position seizures [TPS], and recall position seizures [RPS] measurements. As such, total PS equals IPS + TPS + RPS.) Since PS measurements include total activity for the nonrecall and recall queues of each queue type, the resulting AWTs reflect an average for the physical nonrecall and recall queues and reflect the traffic through each queue type.

The factors defined in Table 3-2 determine the threshold for a given queue.

Table 3-2xxx Factors that determine queue thresholds	
Factor	**Explanation**
Average speed of answer (ANS)	The average amount of time a call waits in the CW queue. It is assumed to remain constant. The most common values for ANS are 2.1, 3.5, and 5.0 seconds. There are three sets of queue threshold tables based on these values. Refer to TOPS *Customer Data Schema*, 297-2271-451, for a complete description of these tables. Note that the CWOFF and CWON threshold values vary with the ANS objective; the DEFLECT threshold value, however, does not.
Number of calls in the CW queue	Number updated by the queued-call counter with every transaction to continually reflect the actual number of calls waiting for position attachment. New calls placed in the queue increase the counter one by one. Queued calls that are served decrease the counter one by one.
Number of occupied positions available to service calls	Number obtained from the same scan program that accumulates force management measurements and is updated every ten seconds.
AWT	Average time required for an operator to handle a call. This value is calculated for each transfer type and printed as the AWT value in the force management reports.

The operator capacity for each call transfer type is determined by the number of positions available to service that transfer type and the amount of time it takes to service a call of that type. For example, if ten operators are able to handle calls from the general queues and each general call requires approximately 30 seconds of operator service time, these ten operators collectively are capable of servicing 20 general calls each minute. When the twenty-first call is enqueued in the general queue, that call waits approximately one minute before an operator is available to provide service.

The operator capacity is inversely proportional to the AWT. As the amount of time it takes operators to service calls decreases, operator capacity increases because the same number of operators are capable of handling more calls. As the AWT increases the operator capacity decreases. This is shown in the following calculations:

$$\frac{10 \text{ positions each receiving 1 call}}{\text{System AWT of 0.5 min}} = 20 \text{ calls per minute}$$

$$\frac{10 \text{ positions each receiving 1 call}}{\text{System AWT of 0.25 min}} = 40 \text{ calls per minute}$$

The number of operator positions available to service calls also contributes to the operator capacity. The operator capacity is proportional to the number of positions. As the number of positions increases, the operator capacity increases. As the number of positions decreases, the operator capacity decreases. This is shown in the following calculations:

$$\frac{10 \text{ positions each receiving 1 call}}{\text{System AWT of 0.5 min}} = 20 \text{ calls per minute}$$

$$\frac{20 \text{ positions each receiving 1 call}}{\text{System AWT of 0.5 min}} = 40 \text{ calls per minute}$$

As the operator capacity changes, the number of calls that can be placed in the queue and still be serviced within a specified time limit changes. To accommodate fluctuating operator capacity, TOPS MPX provides six data tables that are used to limit queue size. When a TOPS MPX call is placed in the CW queue, the queue's AWT for the previous 15-minute period is used as an index into the QTTIDX Table, which in turn indexes the queue threshold (QT) table that should be used for that service type and for that period of time. The DMS dynamically selects the appropriate queuing threshold table every 15 minutes, based on the AWT of the service type for the previous 15-minute period. The number of positions occupied and able to handle that call type then determines the thresholding limitations within the queue threshold table (QT0 through QT5) selected by the DMS.

Note 1: For a given ANS objective (2.1, 3.5, or 5.0 seconds), a set of 18 tables is available for the six queuing threshold tables. Each of the 18 tables has a different AWT, ranging from 15 to 100 seconds in 5-second increments. Operating companies first decide which of the three sets of data tables should be used, based on the desired ANS, then determine which six of the 18 data tables available in that set should be datafilled in the six tables in their switch. It is recommended that the sixth table have the AWT equal to 100.

Note 2: The three sets of 18 data tables are listed and described in *TOPS Customer Data Schema,* 297-2271-451. Preprinted forms, containing the appropriate values for each ANS and AWT, are available in *Customer Data Schema Input Forms,* 297-1001-454. These forms contain the values in the tables provided for an ANS of 2.1 seconds.

The number of occupied positions is used as the index into the QT table selected by the DMS. The index (field OPRANGE) is a numeric range of occupied positions. The reason for these varied ranges is that when there are fewer positions, adding one or two more positions has a much greater effect on the operator force capacity. For example, adding two operators to an existing force of two doubles the operator capacity. Adding two operators to a force of 100 increases the operator force capacity by only two percent.

In addition to the OPRANGE index field, each entry in a QT table contains the CWON, CWOFF, and DEFLECT fields, explained in Table 3-3.

Of the queuing tables listed in the *TOPS Customer Data Schema,* 297-2271-451, six are selected and their values datafilled in the QT0 through QT5 data tables. The thresholds of these tables can be altered if necessary using table control. For example, assume the system ANS is 2.1 seconds and the AWT for nontransfer calls is 40 seconds. This AWT indexes the QTTIDX table at value 40.

Note: The AWT that the DMS selects to index in Table QTTIDX is based on the AWT of the previous 15 minutes; that is, the DMS selects an AWT that is closest to the AWT of the previous 15 minutes. Assuming that AWTs 10, 20, and 40 are datafilled in Table QTTIDX, and the previous 15-minute AWT is 14, then the DMS rounds that to 10 and indexes Table QTTIDX with an AWT of 10 seconds. Similarly, based on the datafill in Table QTTIDX, an AWT of 16 seconds would be rounded to 20, an AWT of 29 would be rounded to 20, and an AWT of 31 would be rounded to 40.

For a team of 20 operators capable of handling nontransfer calls (with 19 through 20 as the range of occupied positions), the DMS turns on the CW indicator when two nontransfer calls are in queue. It erases the CW indicator when only one nontransfer call is left in the queue, and it deflects the sixteenth nontransfer call from the queue and turns on the CD indicator until there are fewer than 15 nontransfer calls in the queue. The CW

indicator is based on the assumption that callers are likely to wait for approximately 30 seconds before disconnecting.

Table 3-3
Fields in QT tables

Field	Explanation
CWON (calls waiting on)	When the number of calls in the queue is greater than or equal to the value of this field, the CW indicator (CW, CW1, CW2, or CW3, depending on the transfer type) is displayed on all administrative position screens (force management cathode-ray tube [FMCRT], in-charge [IC], service assistance [SA]). CW is displayed on the operator position screens of all operators with that transfer type in their combined transfer profile.
	For example, if the CWON threshold is exceeded for the transfer 1 queues (XFR1 recalls and XFR1 initial position seizures), CW1 is displayed on the FMCRT, IC, and SA position screens, and CW1 is displayed on the screens of all operators who have XFR1 in their combined transfer profile. This CW message indicates that the CW queue is becoming full and additional operators may be needed.
	The Sonalert sounds at the IC position (single-traffic) or at the FMCRT (multitraffic) to indicate that calls are being placed in the CW queue and operators should try to handle them as quickly as possible.
CWOFF (calls waiting off)	When the number of calls in the CW queue falls to the value in this field (having previously exceeded the CWON value), the CW, CW1, CW2, or CW3 indicator no longer displays on the administrative and operator position screens.
DEFLECT	When the number of calls in the CW queue is greater than or equal to the value of this field, all new calls are deflected and not added to the queue. The CD indicator (CD, CD1, CD2, or CD3, depending on the transfer type) appears on all administrative position screens, and the Sonalert sounds at the IC position (single-traffic) or at the FMCRT (multitraffic) as an indication that calls are being deflected.

Note: Recalls and 0- calls are never deflected.

If the enhanced MFADS feature is implemented, the telephone company must reevaluate the datafill in Tables QTTIDX and QT0 through QT5 according to projected AWTs whenever parameter TOPS_PEG_MODE in Table OFCENG is changed.

This is because the datafill of the queue threshold tables (QTTIDX and QT0-QT5) is determined by anticipated AWTs (5-second intervals). These AWTs are specific to a telephone company's traffic patterns. When

parameter TOPS_PEG_MODE is changed, the resulting changes in AWTs may require changes in the datafill of these tables.

For example, if the current AWT of a queue type is 24 seconds, and the AWT is reduced to 21 seconds, table changes are not required because the change is within the original 5-second interval. However, if the AWT is reduced to 19 seconds, table changes should be evaluated.

Thresholds for calls deflect

Queue thresholds determine whether a new call turns on a call-waiting lamp, turns off a call-waiting lamp, or queues or deflects a call. These determinations are based on the number of calls enqueued, the number of positions that can service that type of call, how long it takes to service calls of that type, average answer time, and deflection threshold in seconds.

When a call is queued, the following factors determine whether the call should be deflected or placed in the CW queue:

- The current AWT for the transfer type of the call is used as the index into Table QTTIDX. The nontransfer AWT includes work time contributions for GEN calls and GEN recalls. The XFR1 AWT includes work time contributions from XFR1 calls and XFR1 recalls. The XFR2 AWT includes work time contributions from XFR2 calls and XFR2 recalls. The XFR DA AWT includes work time contributions from XFR DA calls and XFR DA recalls.

- The sum of all positions that are capable of handling that call type (regardless of whether the positions also handle other call types) is used as an index into the QT table to obtain the threshold values.

- The sum of the number of calls in the appropriate call and recall queues and the call to be queued is compared to the deflect threshold to determine whether the call should be queued or deflected. If the call is deflected, the CD, CD1, CD2, or CD3 indicator displays at all administrative position screens.

Calls can also be deflected when an overflow condition happens and all queuing resources are in use; that is, the number of calls enqueued exceeds the value set in Table OFCENG parameter TOPS_CALLS_WAITING_Q_SIZE.

Note: For specific queue thresholds, refer to the queue length threshold tables in the Appendix. Tables are provided for an ANS of 2.1 with AWTs of 15 through 100 seconds and for an ANS of 5.0 with AWTs of 20 and 100 seconds.

Considerations for offices with combined transfer positions

In offices with positions that have combined transfer profiles, an incoming call might be placed in a CW queue when it should have been deflected. For

this reason, it is advisable to limit the number of operators capable of handling more than one transfer type.

Consider the following example. The AWT for all transfer types is the same and the operator force is composed of the following:

- ten GEN operators
- five XFR1 operators
- five operators who can handle both GEN and XFR1 calls

For any group of 20 calls handled at one time, the incoming traffic mix that can be handled by these 20 operators can vary from 10 GEN calls and 10 transfer calls to 15 GEN calls and 5 transfer calls.

The five combined transfer positions are counted for both GEN and XFR1 queue thresholding position counts. A total of 15 is used as the index in the QT table for GEN thresholds, and a total of 10 is used as the index in the QT table for XFR1 thresholds. Under these conditions, it is possible for an incoming call to be placed in the CW queue when it should have been deflected.

Assignable grade of service feature - artificial aging

TOPS MPX uses the GEN, XFR1, XFR2, and XFR DA queues to segregate waiting calls. The operating company uses Tables TOPSPOS and OPRDAT to specify the queues from which an operator can select calls. When an operator becomes available, the DMS scans that operator's designated queues for a waiting call, starting with all the recall queues and then scanning all the nonrecall queues. The call that has been waiting the longest is always selected first, regardless of queue type.

Every TOPS MPX call is stamped with an arrival time as soon as it appears at the DMS. If no operators are available, the call waits in a queue, growing older, or aging. When an operator becomes available, the DMS examines the first call in each queue that fits the operator's profile. The system subtracts the call-arrival time from the current time to determine the age of each call, and the oldest call is sent to the operator first.

Each queue has an aging factor assigned to it in Table TOPSQAGE. This factor artificially ages the calls in each queue. The operating company can use Table TOPSQAGE to assign a higher priority to some queues, making it appear to the DMS that a call has been waiting in queue longer than it actually has.

The aging factor is an integer between 10 and 80. Dividing the aging factor by 10 provides the effective call age. Therefore, a queue with an aging factor of 10 ages calls at their actual rate. The artificial age for any queue can be from one to eight times the actual age, and it can be adjusted by increments of one-tenth the actual duration of time.

The following example illustrates how artificial aging is determined:

- The XFR DA queue has an aging factor of 10.
- The GEN queue has an aging factor of 25.
- Call 1 has been waiting in the DA queue for two minutes (actual time).
- Call 2 has been waiting in the GEN queue for one minute (actual time).

The DMS reacts as follows:

- Call 1 is effectively two minutes old [(10 x 2 minutes) / 10 = 2 minutes].
- Call 2 is effectively two and one-half minutes old [(25 x 1 minute) / 10 = 2.5 minutes].

If an operator position becomes available at this time, it is assigned call 2, the call from the GEN queue.

> *Note:* Offices that use assignable grade of service should not mix calls of different service types in the same queue. This practice would render artificial aging useless because calls are aged based on queue, not type of service.

TOPS call queue assignment with QMS

Adding QMS to a TOPS office expands the number of available call queues to 255 and improves the operating company's ability to segregate traffic across these call queues. Office datafill in a group of DMS tables makes it possible to exploit the expanded number of call queues available in TOPS QMS.

Call queue assignment happens in three phases:

1. TOPS uses one of two tables to derive an initial call type for queueing purposes.
2. TOPS uses a series of tables to sequentially refine the call type for queueing purposes associated with a call.
3. TOPS maps the call type for queueing purposes into the call queue and service values understood by the QMS call and agent manager (CAM) for final call queue assignment.

Phase 1: initial call type assignment

Because TOPS QMS can coexist with non-TOPS QMS, the first step of call queue assignment is to determine whether this call should go to QMS at all. To allow for gradual transition to TOPS QMS, Table TOPSTOPT allows operating companies to turn on QMS on a trunk group basis. Specifying QMSCAM in the ACD field for a given trunk causes operator-handled calls arriving over that trunk to be handled by QMS. Specifying TOPSACD, or not datafilling a trunk at all in Table TOPSTOPT, causes the operator-handled calls on that trunk to be handled as in non-QMS ACD.

Each call that arrives in a TOPS office is first checked against Table TOPSTOPT to see whether it should go to QMS. If it is determined that the call is non-QMS, the initial call origination type is determined from Table TOPS, and the other three existing mechanisms for call queue assignment in non-QMS ACD are used. If the call is marked as QMS, the initial call type for queueing is derived from Table QMSTOPS.

Table TOPS is used to derive call queue and class of service for traffic designated as non-QMS in Table TOPSTOPT. Table TOPS provides only four queues for non-QMS calls in the TOPS environment. Table TOPS is a fixed table, meaning that it has a fixed number of tuples with fixed indices. The only change to Table TOPS made by this feature is to extend the number of spare call origination types, effectively enlarging the table. This change increases the flexibility of QMS by providing a larger range of initial call types for queueing.

Operator-handled calls that have been marked for QMS in Table TOPSTOPT encounter the first phase of call queue assignment in Table QMSTOPS. Table QMSTOPS is indexed by the same range of call origination types that are used as indices to Table TOPS. Therefore, Table QMSTOPS is a fixed table, like Table TOPS. Unlike Table TOPS, however, Table QMSTOPS does not map call origination type directly to a call queue. Instead, for each call origination type, Table QMSTOPS provides a new call type for queueing. The tables in QMS call type for queueing refinement are all based on the range of call type for queueing values. The range of call type for queueing values is defined in Table CT4QNAMS, which associates each external, symbolic name with an internal integer index. Table QMSTOPS is used to provide an initial call type for queueing value for each call. This initial call type for queueing is the starting point for the second phase of call queue assignment: the refinement of call types for queueing.

Table QMSTOPS assigns initial call type for queueing values for each call origination type. The range of allowable values for call types for queueing is defined in Table CT4QNAMS, which allows an alphabetic name (a string range) to be associated with an internal integer value. An optional eight-character display for presentation to the operator may be datafilled against each call type for queueing. Existing TOPS call origination displays continue to be provided in QMS TOPS, because of their indispensability for operator training. Redundant displays for call types for queueing would like prove confusing for the operator, so it is recommended that only unique QMS-related displays be datafilled.

For more information about datafilling these tables, refer to *TOPS MPX Translations Guide*, 297-2291-350.

Phase 2: refinement of call type for queueing

In phase 2, the call type for queueing assigned in phase 1 may be refined by successively comparing the characteristics of the call against datafillable queueing criteria. This refining phase allows the office to divide incoming traffic into separately manageable categories based on different call attributes, according to its office-specific criteria.

After passing through all the criteria of call type for queueing refinement, a given call may have had its call type for queueing changed several times, or it may still have its initial call type for queueing. In either case, the call type for queueing associated with the call at the completion of phase 2 of call queue assignment is the call type for queueing that determines the call queue and service to be assigned to the call in phase 3.

Each office using QMS may have a different mix of categories that are optimal for the traffic in that office, just as each office has different translations datafill for the traffic in that office. To allow for the expected variation in the ways different offices wish to use QMS, call type for queueing refinement is designed to be as flexible as possible. The order in which the tables are scanned, as well as the criteria applied, helps provide flexibility.

TOPS QMS provides the following criteria, each with its corresponding table:

- class of service (Table CT4QCLAS)
- restricted billing index (Table CT4QREST)
- inter-LATA carrier (Table CT4QCAR)
- prefix call type (Table CT4QPFXT)
- dialed digits (Table CT4QCLD)
- originating location (Table CT4QORIG)
- time of day (Table CT4QTIME)
- partially automated service (Table CT4QAUTO)
- language (Table CT4QLANG)

The class of service criterion is used to modify the call type for queueing purposes by class of service information associated with the calling number. For example, a call may be designated as coin, hotel, station, or restricted. If this information is missing or incomplete, the call is designated as unknown class.

TOPS software provides for 100 different varieties of restricted telephones. Often these telephones require special treatment, which might involve a different queue. If a match is found in Table CT4QREST, this table overrides any previous determination of call type for queueing.

Inter-LATA carrier processing can have a significant impact on call queueing. An operating company may choose to provide operator services on a per carrier basis through a TOPS software package called TOPS inter-LATA carrier service (TICS). If TICS is in the office, this table allows all calls for a particular carrier to be routed to a particular call type for queueing, which may then map to a call queue number staffed by operators dedicated to the particular carrier.

The prefix dialing of a call is used as a criterion in Table CT4QPFXT. This table allows the operating company to refine the call type for queueing by the prefix type of call: operator assisted (OA) or direct dialed (DD). This information is not available based upon dialed digits, because the prefix information is taken off at an end office. It is, however, available from signaling. This differentiation is useful when offices have positions with different capabilities. For example, a TOPS basic position can process a call dialed 1+555-1212, but it cannot process a call dialed 0+555-1212, because that requires alternate billing capabilities it does not have. The operating company, therefore, might wish to route 1+555-1212 calls to a different queue from 0+555-1212 calls. Used in combination, Tables CT4QPFXT and CXT4QCLAS can provide queue selection capabilities similar to those provided for TOPS ACD by Table BPQUEUE.

QMS TOPS can also route traffic based on the dialed (or called) digits entered by the subscriber. Because the range of possible called digits is quite large, data store and run-time efficiency are potential problems. To provide maximum flexibility without sacrificing efficiency, a two-step process segregates calls by dialed digit. The first step associates groups of called digits with symbolic names in Table TQCLDDIG. The symbolic names are used as a criterion for traffic segregation in Table CT4QCLD. An operating company might use the dialed digits criterion to streamline its work force by folding its business office functions into the operator service center. Or an operating company might prototype new services, such as weather forecasts, hotel and restaurant guide, or operator-assisted yellow pages, on the basis of the dialed number, routing these calls to a special team of operators.

The originating location criterion of a call can be used to segregate traffic with Table CT4QORIG. This table can be used to provide local knowledge operators for DA calls, by routing 411 calls that originate from particular areas to operators who are knowledgeable about those areas. Another use for this table is to route traffic from disabled subscribers to special groups of operators with the enhanced training or equipment needed to best serve these subscribers. This table can also be used to segregate traffic based on predominant language needs of different locations. If a group of dialing numbers or a trunk group is known to be populated by a group of subscribers who predominantly speak a given language, for example, this origination criterion may be used to select a call type for queueing staffed primarily by

operators who speak that language. Just as with the dialed digits feature, TOPS uses a two-step process to provide maximum flexibility without sacrificing efficiency. The first step associates groups of originating digits with symbolic names, in a table called TQORGDIG. Then, once an originating location is determined for the call, Table CT4QORIG is referenced. This table matches old call type for queueing values against the criterion to yield new call type for queueing values.

The time of day criterion allows for the dynamic segregation of traffic on the basis of time of day. A set of tables allow differently treated times of day to be specified for each day of the week and for holidays. When a call arrives, the current date and time are translated through these tables into a value. Table CT4QTIME allows any type of traffic to be diverted to a new call type for queueing based on the value determined upon call arrival. This feature can be used to consolidate several different types of traffic into a smaller number of call types for queueing at known low-traffic periods of the day or night, providing savings in staffing requirements for low traffic periods. For example, all coin and hotel traffic could be routed to a particular team at night, and the other teams could be staffed with operators not yet trained for coin or hotel. Used with host/remote networking by queue type, TOPS QMS expands the capabilities of operator centralization by allowing any type of traffic to be routed to other switches in the operator centralization network by any of the call type refinement criteria.

It may be advisable for an office to segregate traffic that has already received automated service. An example of a partially automated call is a calling card call that initially routes to MCCS or ACCS, but for which the subscriber does not enter the calling card number. When this happens, TOPS tries to connect the call to an operator. Special groups of operators could be used to handle different types of partially automated calls. This segregation would allow the operating company to have a large group of operators who do not need to serve partially automated calls and thus do not require the special training for handling these calls. Table CT4QAUTO allows all the automated services TOPS provides (ACTS, ACCS, MCCS, AABS, ADACC, and ADAS) to be used as a criterion for queueing.

Table TOPSLANG is used to define a language attribute for TOPS calls. A language value is assigned to a call either through operator keying action or by an automated service. Once a language is assigned to a call, it may be used as a criterion for queueing in Table CT4QLANG. Since language is not assigned until the call has been to an operator or an automated service, this table is useful only for those two types of calls.

Phase 3: final call queue assignment

The refinement phase ends when the characteristics of the call have been applied to all the call type for queueing tables in the appropriate order. The call type for queueing associated with the call following the call type for

queueing refinement phase may be the same as the initial call type assigned in phase 1, or it may have changed several times in phase 2. In either case, the refined call type is used in phase 3 as the basis for the assignment of the QMS queue number in Table TQMSFCQA. The final call type for queueing is used as an index to this table, which returns a numeric value that can be identified by the CAM component of QMS.

An important consequence of converting a TOPS office to TOPS QMS is that the default priorities associated with recalls in the non-QMS environment must be datafilled in TOPS QMS, through Table TQMSFCQA. This table provides much greater flexibility in handling recall priorities, but it requires explicit specification for each potential type of recall.

Afterward, the call routes to an operator who serves that call queue. When that operator releases the call, it may recall to TOPS, requiring further operator assistance. For example, on a DA call a subscriber may remain off-hook following an automated recording unit announcement to return to a live operator. In the ACD system, calls that recall to the system are serviced before calls that have not yet been to an operator. In QMS, relative priorities are expressed on the basis of call queues, so a method is provided to allow recalls to route to different call queues.   For traffic that recalls to the operator, once a recall has been refined by the call type for queueing tables, a different call queue may be associated with the final call type for queueing.

> *Note:* TOPS QMS does not affect the queueing of assistance and in-charge positions. Queueing associated with assistance and in-charge positions remains unchanged.

Thresholds for calls deflect in QMS

The deflection of calls in QMS is controlled through the QMS Call Queue Definition Table, Table QMSCQDEF. The datafill in this table determines whether, and at what point, calls will be deflected. Three fields are involved: ALLOWDEF, CQCDTIME, and MINODEFL.

Field ALLOWDEF indicates whether calls marked for this call queue should be deflected if the predicted wait for a given call exceeds a threshold. If ALLOWDEF is set to Y (for yes), the deflect threshold must be specified in field CQCDTIME.

Field CQCDTIME indicates the point at which calls are deflected from queue (expressed in tenths of seconds within a range of 0 to 32766). If the predicted wait time for newly arriving calls exceeds the CQCDTIME value, then new calls are deflected from the queue until the predicted wait time drops below this threshold.

The predicted wait time is determined by monitoring the rate at which calls are being served from the given queue (for the preceding 60 seconds, updated every 10 seconds), along with the number of calls in queue. For

example, if 120 calls were served in the previous 60 seconds (that is, calls are being served at the rate of two calls per second), and the queue holds 29 calls, then the projected wait time for a newly arriving call is (29 + 1)/2, or 15 seconds. Calls served includes both calls presented to an operator and calls abandoned. If no calls have been served for a given call queue in the preceding 60 seconds, then the QMS CAM is unable to predict the wait time of an arriving call. In this case, the QMS CAM does not deflect calls from the queue until a call is served (and the 60-second tally is updated to reflect it), and a valid predicted wait time is obtained. For example, if calls in TOPS call queue 1 are being served at the rate of two calls per second, and 124 calls are in the queue when a new call arrives, the new call will be deflected, since the projected wait time (124/2 = 62 seconds) exceeds the CQCDTIME value (60.0 seconds).

> *Note:* There is an exception to this procedure if, in its message to the QMS CAM requesting an agent for the call, the application explicitly indicates that a call should not be deflected. In this case, the QMS CAM tries to place the call in the call queue regardless of the CQCDTIME threshold.

Field MINODEFL specifies a minimum number of calls in queue below which calls should not be deflected. The range, expressed in tenths of seconds, is 0 to 32,766. For example, if the MINODEFL field is set to 5, and TOPS call queue 0 contains four calls, a call that arrives when no agent is free is placed in queue even if the predicted wait time exceeds the CQCDTIME threshold. If five calls were already in the queue when the new call arrived, then the threshold would apply. This mechanism prevents calls from being prematurely deflected from call queues with very low or erratic throughput.

Standalone TOPS MPX with QMS

The TOPS call-processing application performs four functions associated with queueing TOPS positions and calls:

- defining and undefining positions to the CAM

- making positions available and unavailable

- assigning a call queue to each call that arrives at TOPS

- requesting and canceling positions

When an operator logs in at a position, TOPS defines that position to the QMS CAM. Defining the position tells the CAM which call queues the position can serve while that operator is logged in. It also identifies the queue to which the position belongs when it is idle. TOPS call processing also undefines positions from the QMS CAM during operator logout. This tells the QMS CAM to cancel any data associated with the position.

TOPS call processing tells the QMS CAM whether a position is available or unavailable to accept calls. An available position becomes unavailable to

serve calls when made busy by an operator using the **Make Busy** key, or when a call arrives at the position. An unavailable position becomes available when made available by an operator using the **Make Busy** key, or when an operator at the position releases a call.

Each call that arrives at TOPS is assigned to a call queue based on varying criteria specified by the operating company. When an operator position is required for a call, TOPS call processing asks the CAM for an operator position capable of serving the particular call queue assigned to the call.

TOPS call processing determines whether an operator position is required for a call. If a position is required, TOPS asks the CAM for a position capable of serving the call queue assigned to the call. TOPS call processing can also cancel a previous request for an operator. (This would occur if a calling party went on-hook while waiting for an operator.)

Operator profiles

TOPS QMS provides the ability to create call queue, controlled traffic, and service profiles for operators through the use of profile tables. Call queue profiles allow an operating company to specify the call queues an operator can serve by associating a particular call queue profile with an operator number.

Controlled traffic profiles allow an operating company to specify the types of calls an operator can serve. They are used mainly for operator training.

Service profiles allow an operating company to associate a list of service names with a service profile number. The service profiles are then associated with operators and positions to indicate their service-handling capabilities. During login and datafill, TOPS software checks to ensure that the service profiles match the equipment and operator profiles.

> *Note:* When an operating company adds operator IDs to accommodate QMS, it is crucial that the database vendor be given the correct updated lists of operator and position IDs, so that the vendor can assign permissions appropriately.

Senior operators

Using TOPS MPX with QMS allows an operating company to create a new class of operators called senior operators, who can assist other operators (even completing their calls) as their primary task and serve subscriber-initiated operator traffic as their secondary task. Unlike service assistants, senior operators can serve subscriber-initiated traffic and complete the calls to which they provide assistance. They cannot, however, monitor and page other operators as service assistants can. Table 3-4 summarizes the major differences between the capabilities of senior operators and those of service assistants.

Table 3-4
Capabilities of senior operators versus service assistants

Capability	Senior operator	Service assistant
Use QMS queueing	Yes	No
Call completion for assistance calls	Yes	No
Serve non-assistant traffic	Yes	No
Receive directed calls	No	Yes
Paging capability	No	Yes
Monitor capability	No	Yes

Coexistence of TOPS ACD and QMS

Because QMS may need to be introduced into a traffic office gradually, it is designed to coexist with the current automatic call distribution (ACD) system. A gradual transition may be made from TOPS ACD to QMS on a position and a trunk group basis.

Datafill in Table TOPSPOS specifies the type of queueing to be used by each position. Datafill in Table TOPSTOPT specifies the type of queueing to be used by each trunk group. This allows for the gradual transition of operator positions from TOPS ACD to QMS, on a position-by-position and trunk-group-by-trunk-group basis.

Note: In order to be used in QMS, positions must be defined on a QMS team.

Host/remote networking by queue type renamed the datafill for TOPS ACD queues from GEN, XFR1, XFR2, and DA to CQ0, CQ1, CQ2, and CQ3. For offices where TOPS ACD and QMS coexist, the operating company must reserve the first four call queues (CQ0 through CQ3) for TOPS ACD. In this situation, TOPS QMS may use call queues beginning with CQ4.

Note: Routing to an alternate host is not without risk. It may cause an already overloaded network to be further overloaded by trying to route a call first to the primary host then to an alternate host, creating twice the work and messaging. The decision to route a call to an alternate host is generally a good one if the alternate host is available. However, if the alternate host is unavailable for some reason, twice the messaging is used for same result (a call routed to treatment). For example, using an alternate host would have adverse effects during a nationwide or region-wide traffic overload such as Christmas. In this case the extra messaging would serve only to further degrade performance on an already overloaded network.

Force management measurement definitions

This chapter defines the force management measurements and statistics printed by the DMS and explains how they are derived. Measurements and statistics available under the Queue Management System (QMS) are presented at the end of the chapter.

The DMS accumulates the following force management (FM) measurements for the TOPS MPX system in software registers:

- initial position seizure (IPS)
- calls-waiting (CW)
- occupied positions (POS OCC)
- work volume (WV)
  - call-busy work volume (CBWV)
  - noncall work volume (NCWV)
- idle time (IDLT)

These terms are defined in the following pages. The DMS provides these measurements in one of two ways:

- peg counts (for example, IPS)
- usage count
  - real time (for example, WV , IDLT)
  - ten-second scan (for example, POS OCC, CW)

When the optional enhanced mechanized force administration data system (MFADS) is in effect, the following measurements are also accumulated:

- position seizure (PS)
  - transfer position seizure (TPS)
  - recall position seizure (RPS)
- nonqueue work volume (NQWV)

The basic FM measurements consist of one peg count register and four usage count registers. A peg count register counts the occurrences of a

defined event such as IPS. One usage count measures WV and is accumulated in real time. Another measures IDLT and is also accumulated in real time. The other two usage counts provide the number of calls waiting in the queue and the number of occupied positions in that state; they are accumulated in 10-second scans. All three usage measurements represent accumulations of the times a defined condition existed.

When a scan point is sampled, the condition that exists is assumed to remain constant throughout the full 10-second scan interval. If the scan program observes a busy condition when sampling a scan point, the usage register is increased by one, which represents a full ten seconds of busy usage. If after 30 minutes the scan register has increased 180 times, the equipment under observation has been busy for the full half hour (180 x 10 = 1800 seconds = 30 minutes).

Because the usage registers are incremented on the basis of a 10-second scan program, the contents of the registers are accumulated in 10 call seconds (XCS). One XCS represents an amount of time equal to 10 seconds. Thus a half-hourly usage register accumulation of 121 equals 121 XCS, 12 hundred call seconds (CCS), or 1210 seconds.

Enhanced MFADS measurements

Implementing the optional enhanced MFADS feature affects FM measurements. This feature collects data based on an expanded range of PS. In addition to collecting data based on IPS, the enhanced MFADS feature also includes data for TPS and RPS. These data are collected along with IPS-based data collection. The information is stored in two separate databases. The enhanced MFADS feature provides various mechanisms to select the type of calculations that will be performed. In addition, the screen data summary displays and the printed report data can be manipulated to reflect either IPS- or PS-based statistics.

The following summary identifies the changes:

1   Call-based PS pegging is replaced with measurements for all position seizures. Seizure-based pegging expands the data about each queue that is available to the MFADS interface. Also, PS and WV measurements are applied to the source queue type rather than to the destination queue. This change improves the PS and WV measurements for calls transferred by operators.

2   A set of measurements for services such as DA is introduced to measure more accurately the work performed by operators providing multiple services.

3   NCWV and IDLT are reported separately for each traffic office queue type. These data are provided partially in MFADS. This change allows the telephone company to generate statistics for each traffic office queue type.

4   A new WV measurement, nonqueue work volume (NQWV), is added for each traffic office. This measurement identifies operator position WV not attributable to an operator or queue (that is, when the operator's headset is seated but the operator is not logged into any queue).

5   System calls waiting are presented for each queue type. MFADS provides a system total for the nontransfer (nonXFR) queues, and separate totals for transfer 1 (XFR1), transfer 2 (XFR2), and DA; enhanced MFADS allows telephone company calculation of average speed of answer (ANS) for all queue types.

6   The improvements in PS and WV measurements may be applied to existing force management reports.

Enhanced MFADS PS and WV measurements may be either restricted to this feature or extended on a limited basis to other TOPS features.

The parameter TOPS_PEG_MODE in Table OFCENG defines the scope of enhanced MFADS measurements. If this parameter is set to IPS, this feature is independent of other TOPS features except for the FORMAT field discussed in Chapter 7, "Mechanized force administration data system."

If this parameter is set to PS, enhanced MFADS measurements are applied to queue thresholds, operational measurements, operator feedback registers, operator study registers, and the data present in the MFADS interface when the MFADS FORMAT field is set to FORMAT1 (or FORMAT1A), disabling FORMAT2 enhanced MFADS reports. They are also applied to reports from the force administration data system (FADS), the system administration data system (SADS), and the traffic administration data system (TADS).

The effect of this option is that IPS-based measurements are replaced with PS measurements, because of the internal database structures. Force management maintains several measurement databases. The primary database contains data used in queue control, TOPS reports, and the current MFADS interface. This database is replicated for 15-minute, 30-minute, 6-hour, and other periodic reports.

Enhanced MFADS implements a separate database that is duplicated only for 15- and 30-minute reports. When TOPS_PEG_MODE is set to IPS, new measurements are placed in the enhanced MFADS database and pegging of the primary database is unchanged (that is, it is IPS-based).

If TOPS_PEG_MODE in Table OFCENG is set to PS, pegging of the primary database is PS-based. That is, the database IPS fields for each queue type contain the sum of initial position seizures, plus transfer position seizures, plus recall position seizures (IPS + TPS + RPS). This pegging occurs when the enhanced MFADS database is pegged and is source queue based.

Since the data collected represents measurements for each seizure, the values in the IPS fields increase, and the calculation of average work time (AWT) decreases. This reflects per-seizure statistics, rather than per-call data.

For example, assume there is a single queue type with 50 recalls, 100 IPS, and 1500 seconds of CBWV. The IPS-based AWT (ignoring NCWV) for this queue is 15 seconds. If PS measurements replace IPS measurements, 150 PS is recorded for the queue type. This reduces the AWT to ten seconds, the average work time required to support each PS for the queue type.

In addition to changing the pegging procedures for the primary database, the parameter TOPS_PEG_MODE in Table OFCENG also controls the pegging of PS for operational measurements and the operator feedback registers. If TOPS_PEG_MODE is set to PS, the pegging of IPS in registers IPSZ and IPSZ2 of group TOPSPSZ is based on queue type measurements. If this parameter is set to IPS, operations measurements do not change.

Similarly, when TOPS_PEG_MODE is set to PS, the data presented at an operator's position represent PS, rather than IPS measurements. (The data displayed are based on PS, but the screen display column titles continue to indicate IPS.) If this parameter is set to IPS, the screen displays indicate the current IPS measurements.

> *Note:* The STATSPAC feature is implemented in a separate database and is not affected by TOPS_PEG_MODE.

Position seizures

Force management currently measures operator position seizures from the perspective of a call. That is, rather than pegging the individual seizures that occur when a call passes through multiple queues (transfers and recalls), the first seizure only is pegged. That seizure is called the initial position seizure (IPS). IPS measurements are maintained currently for all active queue types on a per-traffic office basis.

IPS is a peg count of all subscriber- or outside operator-originated calls successfully reaching a TOPS MPX operator position. Position reseizures (system-generated recalls such as notify and coin overtime) and operator-originated calls (delay calls such as subsequent attempts) are not included in the IPS count.

Each call is pegged only once. Because each call is pegged just *before* it is released from a position, it is pegged according to the transfer mark assigned to it when it is released. The pegging procedure depends on whether the operator transfers the call or directs a recall to a specific queue.

For example, if a call arrives at an operator position as a general (GEN) call and the operator presses one of the transfer keys to transfer the call to an XFR1 or XFR2 position, the IPS is pegged as either an XFR1 or an XFR2 call, depending on which key was pressed. If the operator does not transfer the call to another position before releasing it, the IPS is pegged as a GEN call. If the incoming call is routed directly to a transfer operator, who releases the call without transferring it again, the IPS is pegged as either an XFR1 or XFR2 call, as appropriate.

The value for system-generated recall and operator-generated delay call IPS is incremented and shown in the call type, study register, and STATSPAC report summaries if RECALL and DELAY have been assigned in Table CLASSNAM. The recall and delay call IPS values are not included in system totals displayed on the FM and traffic office (TO) reports. FM and TO reports are discussed in later chapters.

There are limitations to FM measurements for IPS-only statistics. First, PS work volumes are assigned to the destination queue type rather than the source queue type for transfers. Second, IPS-based pegging does not measure all position seizures. Since calls may pass through more than one queue, PS-based statistics provide a better indication of customer wait times and team performance.

Implementing the enhanced MFADS feature removes the limitations of IPS-only pegging by providing PS and WV data for each queue used by a TOPS call. The PS and WV measurements are applied to the source queue type rather than the destination queue. These measurements are still generated when an operator releases a call. On a per-traffic office basis, three types of PS and WV measurements are collected for each queue type (GEN, XFR1, XFR2, DA, and centralized automatic message accounting [CAMA]).

> *Note:* CAMA is not an applicable call type in a TOPS MPX DA environment. It appears as a category on reports, however, (followed always by zeros) and is calculated by the system in the same way as for TOPS MP . For that reason there are references to CAMA in this chapter.

Table 4-1 defines the three types of position seizures.

Table 4-1
Types of position seizures

Type	Description
IPS	If the position seizure is the first for the call, an IPS and CBWV are pegged for the traffic office queue types.
TPS	If the position seizure is the result of an operator transfer, a TPS and CBWV are pegged for the traffic office queue types except CAMA.
RPS	If the position seizure is the result of a system recall, an RPS and CBWV are pegged for the traffic office queue types except CAMA.

Note: Total PS equals IPS + TPS + RPS.

In addition to the improvements in the transfer seizure pegging, the PS-based measurements of this feature also provide advantages for calculating MFADS statistics.

For example, current IPS-based measurements calculate AWT for a total call. Since calls can pass through several queues, AWT calculations based on individual seizures provide a better indication of team performance. The PS measurements of the enhanced MFADS application extends AWT calculations to the PS level for each queue type.

Since IPS calculations are provided by enhanced MFADS, the telephone company has the option of continuing with IPS-based AWTs, if desired. This is done by setting the Table OFCENG parameter to IPS. An IPS parameter setting makes the enhanced MFADS feature independent of other TOPS features. If this parameter is set to PS, enhanced MFADS measurements will be applied to queue thresholding, reports (FADS, TADS, and SADS), operational measurements (OM), the operator feedback registers, the operator study registers, and the data presented to the MFADS interface.

In addition, the CBWV measurements allow the direct calculation of the average occupied positions (AOP) from the data provided to the MFADS interface. Specifically, AOP can be calculated for each of the traffic office queue types. This formula is CBWV + NCWV + IDLT divided by the MFADS period.

Using MFADS calculations, force management does not distribute the operator's AOP over the queue types served. (The AOP is derived from XCS occupancy scans; when an operator serves multiple queues, the operator is included in the AOP calculation of the highest numbered queue type served by the operator.)

With enhanced MFADS, the multiqueue operator's time is distributed over all queue types served by the operator. The resulting calculations identify the AOP for each queue type in each traffic office.

In order to perform the new AOP calculations, NCWV and IDLT must be reported for each of the traffic office queue types.

> *Note:* Force management collects NCWV and IDLT in team and system pegging registers. These registers are used in the calculation of the system and team AWTs presented in the FADS, TADS, and SADS FM reports. Force management prorates the team NCWV and IDLT times over the queue types supported by the various teams. These per queue NCWV and IDLT measurements are presented to the MFADS interface. Since the per queue allocation of NCWV and IDLT is subject to rounding, the AWTs displayed in FADS, TADS, and SADS reports and the AWTs calculated for MFADS reports may not be identical.

Calls waiting

Calls waiting (CW) is a usage measurement of the queued call counter. The DMS scans the queues every ten seconds to determine the number of calls waiting for an operator. The queued call counter is updated with every transaction to reflect additions to and subtractions from the queue of calls waiting for position attachment. Using MFADS calculations, system totals are provided for nontransfer queues (CAMA and GEN) and separate totals are provided for XFR1, XFR2, and DA queues.

Implementing enhanced MFADS provides operating company calculation of ANS for all queue types (CAMA, GEN, XFR1, XFR2, and DA) rather than system totals for nontransfer queues (CAMA and GEN) and separate totals for XFR1, XFR2, and DA queues. Since traffic offices share queues, ANS calculation on a per-traffic office basis is not meaningful. The calls-waiting measurements presented to the MFADS interfaces are the sums of the calls waiting for the nonrecall and recall queues of each queue type.

Occupied positions

Occupied positions (POS OCC) is a usage measurement of all occupied operator positions. The DMS scans the position state counters every ten seconds and records the number of occupied operator positions.

A position is defined as occupied when a headset is plugged into the position headset jack. There are two exceptions:

- The operator position is in training mode.
- The operator position is listed as OD (out-of-order). A position is listed as OD under the following conditions:

- The position is in either a maintenance or a system-busy state. This occurs when the DMS recognizes that a position is faulty and removes it from service.
- The position is in a man-busy state. This occurs when the position is manually removed from service by entering the BSY command from the MAP and from the terminal position control administration and maintenance interface (TAMI).

Work volume

Work volume (WV) is a usage measurement of all occupied operator positions that are handling a call (CBWV) or are unavailable to handle a new call (NCWV). Work volume is measured in seconds (real time) and is accumulated for all positions. This statistic excludes IDLT. Using MFADS, work volume is divided into CBWV and NCWV.

If the enhanced MFADS feature is implemented, a third WV category, NQWV, is added. In addition, enhanced MFADS allows the telephone company to generate separate statistics for NCWV.

Work volume is explained in the following paragraphs.

Call-busy work volume

Call-busy work volume (CBWV) is the total amount of time an operator spends actively handling a call. CBWV is pegged against the transfer type of the call (non-XFR, XFR1, or XFR2). Non-XFR CBWV includes CBWV for both general and CAMA calls.

Note 1: Position seizures are not pegged for delay calls. However, the CBWV associated with a delay call is pegged against the position's current queue type.

Note 2: Non-XFR is synonymous with GEN. CAMA calls are also considered general calls.

Noncall work volume

Noncall work volume (NCWV) is the total amount of time an operator is not actively handling a call but is unavailable to accept a new call. For example, an operator is unavailable to accept calls while in make-busy mode. NCWV is included in the system totals. For operators handling only nontransfer calls (GEN and CAMA), the complete NCWV is included in the nontransfer (non-XFR) totals. For information about NCWV accumulated by operators whose profiles include transfer calls, refer to "Call transfer statistics" on page 5-21.

Note: Delay call and recall WV are pegged against CBWV and included in the system (SYST), non-CAMA (NCAMA), and CAMA WV totals of the FM and TO reports. (Current WV is derived from CBWV + NCWV .) WV for delay calls and recalls is generated and used to calculate AWT in the call type and study register summaries. This AWT appears in the call type summaries only when DELAY or RECALL or both are assigned in Table CLASSNAM. These calls always generate WV, regardless of whether they appear in the call type or study register summaries.

When the enhanced MFADS feature is implemented, NCWV is presented as a separate field for each traffic office queue type except CAMA (GEN, XFR1, XFR2, and DA). This change extends the generation of TO statistics to individual queue types and gives the operating company the option of generating separate CBWV- and NCWV-based statistics.

Nonqueue work volume

When the operator inserts a headset into a position, force management begins collecting WV for that position. If the operator subsequently logs on, this WV is applied as noncall WV for the queue types served by the operator.

If the operator does not log on during the FM measurement period, however, this WV cannot be applied to queues (because there is no operator queue profile). When this occurs, the enhanced MFADS feature accumulates this WV on a per-team basis as NQWV.

Identifying work volume in reports

Without the NQWV calculations added in, the WV in hundred call seconds (WV-CCS) printed in the FM and TO reports is the total of CBWV and NCWV. In the system section of the report, the WV-CCS is the total of all CBWV and NCWV. In the XFR section, the WV-CCS is the total of the CBWV and NCWV for each transfer type.

When NQWV data are accumulated, these data are presented in the new MFADS traffic office extended measurement reports. Traffic office reports contain a series of queue WV, SWV, and NQWV reports. NQWV is presented in the extended measurement traffic office report and is associated with the measurement type of the data in the report. (The measurement type is always identified as MO.) The NQWV field contains the NQWV for the traffic office in the current MFADS period and is used in total WV calculations.

Generating WV

The following conditions generate WV:

- NCWV is generated when an operator connects a headset at a position. NCWV continues to be generated until the operator logs on and presses the **Start** key to access the toll and assist screen. If the operator logs on but does not press the **Start** key, NCWV is still generated. If the operator disconnects the headset before logging on, the system stops accumulating NCWV.

- If the operator does not log on during the current FM period, this WV accumulates on a per-team basis as NQWV.

- CBWV is generated when a call is presented to an operator. When an operator releases a call from the position, the system stops accumulating CBWV.

- If the operator presses the **Make Busy** key to stop call arrivals without a call active at the position, the system starts generating NCWV. If the operator presses the **Start** key to return to the TA screen, the operator is returned to the idle state and the system stops generating NCWV.

- CBWV is generated when an operator is handling a call. If the operator presses the **Make Busy** key while handling a call, CBWV continues to accumulate until the call is released. Once the call is released, NCWV begins accumulating. The operator then must press the **Start** key to return the position to the idle state and stop generating NCWV.

- CBWV is accumulated while an operator is handling a call. When an operator disconnects the headset before releasing a call, the system stops accumulating CBWV. When an operator reconnects the headset to complete this call, the system begins accumulating NCWV. The system stops accumulating NCWV and starts accumulating CBWV when the operator logs on to complete the call. CBWV stops accumulating when the call is released. If the operator disconnects the headset before logging on, the system stops accumulating NCWV.

- CBWV is generated when an operator handles a delay call. With regard to work volume, delay calls are treated the same as calls that originate from a subscriber.

Idle time

Idle time (IDLT) is the amount of time an operator spends at the position waiting for a call to arrive. Pegging IDLT improves the accuracy of the AOP and percent occupancy (%OCC) statistics.

Pegging IDLT in addition to CBWV and NCWV accounts for all the time an operator spends logged on to a position. Unless the enhanced MFADS feature is implemented, IDLT is not included in the WV-CCS totals in the FM and TO periodic reports and is used solely to compute %OCC and AOP.

If enhanced MFADS is implemented, MFADS reports include IDLT time as a separate field for each traffic office queue type report (GEN, XFR1, XFR2, and DA) except CAMA.

Force management data manipulation (derived measurements)

The data accumulated in the software registers by the DMS are used to calculate the ANS, AWT, AOP, board hours (BDH), and %OCC. These values print in the FM and TO periodic reports and at the FADS teletypewriter (TTY). For complete details on the TO and FM periodic reports, refer to Chapter 8, "ACD TTY commands, queries, and reports."

Table 4-2 defines the terms used in FM measurements. The subsequent sections of this chapter provide the formulas used to derive these measurements.

Table 4-2 Definitions of FM measurements	
Term	**Definition**
Average speed of answer (ANS)	The number of seconds the average call waits to reach an operator.
Average work time (AWT)	The time in seconds required to handle the average call.
Average occupied positions (AOP)	The average number of occupied positions in a fifteen- or thirty-minute period.
Board hours (BDH)	The total number of hours operators spend logged on and accumulating work volume.
Percent occupancy (%OCC)	The amount of time (expressed in a percentage) that logged-on operators are not available to handle new calls.

How ANS is derived

Average speed of answer (ANS) is the number of seconds that the average call waits to reach an operator. Since queues are shared by traffic offices, ANS is valid only at the system level. The ANS can be generated for each queue type and as a system total.

Using MFADS calculations, ANS relies on IPS instead of PS measurements. In this case, ANS is calculated by dividing the XCS calls waiting (multiplied by ten) by an adjusted IPS value. An adjusted IPS is necessary to prevent artificially low ANS values from appearing when scans are missed under heavy CPU load. An adjusted IPS is derived by multiplying IPS by the ratio of the actual scans (multiplied by ten) to the MFADS period.

The following formula is used currently to calculate ANS:

$$\frac{\text{Calls waiting XCS} / 10}{\text{Adjusted IPS}}, \text{ where adjusted IPS} = \frac{\text{Actual scans}}{\text{Expected scans}} \text{ X IPS}$$

Example:
$$\frac{87(\text{XCS}) / 10}{402} = 2.2 \text{ (seconds)}$$

Using MFADS calculations, ANS is calculated internally by the DMS for each TO and FM periodic report. The ANS value in the SYST row of the TO and FM reports is derived from the sum of the CW-CCS and IPS data for all queues (including XFR1, XFR2, and DA, if active). CAMA calls are subtracted out of these data and displayed in the NCAMA row, and the CAMA row shows data for CAMA calls only.

Implementing the enhanced MFADS feature allows ANS calculations based on PS instead of IPS. If IPS measurements are used, ANS reflects the average time a call waits in queues. If PS measurements are used, ANS indicates the average time a customer waits in a queue for each seizure.

The enhanced MFADS feature provides ANS calculation for all queue types (CAMA, GEN, XFR1, XFR2, and DA) rather than system totals for nontransfer queues (CAMA and GEN) and separate totals for XFR1, XFR2, and DA queues.

How AWT is derived

Average work time is the length of time, in seconds, used to handle the average call (including all operator-unavailable time).

The general equation for AWT calculation is to divide the work volume by the number of seizures. Currently, only IPS is a part of the formula, as follows:

$$\frac{\text{Work volume seconds}}{\text{IPS}}$$

Example:
$$\frac{16,920}{402} = 42.1 \text{ (seconds)}$$

If enhanced MFADS is implemented, the number of seizures can be based on IPS, or total position seizures (IPS + TPS + RPS). If IPS measurements

are used, AWT is the average work time per call. If PS totals are used, AWT is the average work time per PS.

AWT is calculated internally by the DMS for each TO and FM periodic report. The AWT can be calculated for each traffic office queue type, for each traffic office, for the system, and for each system-level queue type.

How AOP is derived

Average occupied positions is the average number of operators occupying positions over a 15- or 30-minute period. AOP is calculated internally by the DMS for each TO and FM periodic report by dividing the sum of the respective work volume (CBWV + NCWV + IDLT) by the actual number of seconds in the MFADS period. The following formula is used to calculate AOP:

$$\frac{CBWV + NCWV + IDLT}{\text{Number of seconds in the period}} = AOP$$

Example:
$$\frac{34{,}500 + 460 + 4140}{1800} = 21.7 \text{ (average number of operators)}$$

This statistic is calculated and printed on the FM 15-minute and FM 30-minute reports. The AOP can be calculated for each traffic office queue type, for each traffic office, for the system, and for each system-level queue type.

Note: This method of AOP calculation introduces a small error for operator sessions spanning MFADS periods. CBWV is pegged when an operator releases a call. If a session starts in one period and ends in the next, CBWV for the session is pegged in the second period. The error introduced is the difference between CBWV *carry-in* and *carry-out* relative to adjacent periods.

How BDH is derived

Board hours is the total number of hours that operators spend logged on. The BDH value, reported only in the 6- and 24-hour TO and FM reports, is calculated internally by TOPS MPX, using the following formula:

$$\frac{CBWV + NCWV + IDLT}{3600} = \text{Board hours}$$

Example:

$$\frac{34,500 + 460 + 4140}{3600} = 10.8 \text{ (board hours)}$$

How %OCC is derived

Percent occupancy is the ratio of operator time spent handling calls (CBWV or NCWV) to the total time operators are assigned to TOPS MPX positions for handling calls. The percent occupancy of the operator team is the position occupancy measurement given as a percentage. The following formula is used to calculate %OCC:

$$\frac{CBWV + NCWV}{CBWV + NCWV + IDLT} \times 100$$

Example:

$$\frac{48,600 + 648}{48,600 + 648 + 5832} \times 100 = 89\% \text{ OCC}$$

This statistic is calculated and printed on all TO and FM periodic reports. It can be calculated for each traffic office queue type, for each traffic office, for the system, and for each system-level queue type.

Calls-waiting registers contain data measured in XCS. The CW-XCS value is converted to CCS for use in the TO and FM periodic reports. Work volume is accumulated in seconds and converted to CCS values for use in the periodic reports. The DMS uses the XCS value for CW and the real time value (seconds) for WV when calculating %OCC, ANS, and AWT. The DMS then rounds WV and CW register values to the nearest integer CCS value and prints the CCS values on the periodic reports.

The DMS rounds XCS to CCS for the values in the FM15 and FM30 periodic reports. The XCS values are divided by ten, then rounded to the nearest integer CCS value. The values for CW-CCS and ANS might differ because of the rounding. For instance, if CW-XCS is equal to 4 XCS, this CW-XCS value is used to calculate ANS. An ANS value is provided on the report, but the CW-CCS value on the report is 0 CW-CCS, 4/10 = 0.4. When 0.4 is rounded off, the CW-CCS value equals zero even though the value used to calculate ANS is still 4 XCS.

The DMS rounds seconds to CCS values for the FM15 and FM30 registers. Rounding seconds to CCS values is done for WV. To calculate the CCS value from seconds, divide the seconds value by 100 and round to the nearest integer value as shown above.

FM and TO periodic reports

The force management data described in the previous pages is printed at a TTY in the form of periodic reports. These reports are described in Chapter 8, "ACD TTY commands, queries, and reports."

Four FM periodic reports provide statistics for single-traffic or multitraffic offices. The FM periodic reports defined in Table 4-3 are printed at the SADS or FADS TTY.

Table 4-3xxx
Force management periodic reports

Report	Definition
FM15	Provides a 15-minute accumulation of FM statistics. If requested, it is printed on the hour, half hour, and quarter hour.
FM30	Provides a 30-minute accumulation of FM statistics and is printed automatically on the hour and half hour.
FM6HR	Provides a 6-hour accumulation of FM statistics in addition to a summary of IPS and AWT by call type; it is printed automatically every 6 hours following the start of day.
FM24HR	Provides a 24-hour accumulation of FM statistics in addition to a summary of IPS and AWT by call type. It is printed automatically every day immediately after the start of day.

In a multitraffic office, four additional periodic reports are printed at the TADS TTY within each individual TO provide system data for that traffic office. These reports are defined in Table 4-4.

Table 4-4xxx
Traffic office periodic reports

Report	Definition
TO15	Provides a 15-minute accumulation of TO statistics for the traffic office, as well as overall system statistics. If requested, it is printed on the hour, quarter hour, half hour, and three-quarters hour.
TO30	Provides a 30-minute accumulation of FM statistics for a specific traffic office. This report also includes overall system statistics. It is printed automatically on the hour and half hour.
TO6HR	Provides a 6-hour accumulation of FM statistics for a particular traffic office, overall system statistics, and a summary of IPS and AWT by call type. It is printed automatically every six hours following the start of day.
TO24HR	Provides a 24-hour accumulation of FM statistics for a particular traffic office, overall system statistics, and a summary of IPS and AWT by call type. It is printed automatically every day just before the start of day.

Note: The start of day is set in Table OFCVAR, parameter TOPS_START_OF_DAY as 600 (6:00 A.M.) or 0 (12:00 midnight).

The basic FM measurement registers are redundant. There are two sets of accumulating registers and three sets of holding registers. The first set of accumulating registers overwrites into the holding registers at 900 seconds (15 minutes) into the clock hour. The FM15 report prints if requested. The accumulating function is transferred to the second set of accumulating registers.

Data in the first set of accumulating registers are frozen until 1800 seconds (30 minutes) into the clock hour, when these registers empty out to zero and begin to accumulate for the next 15-minute period. Data from the second set of accumulating registers are overwritten into the holding registers. The FM15 (if requested) and FM30 reports print.

Data in the second set of accumulating registers are frozen until 2700 seconds (45 minutes) into the clock hour. This process of alternating accumulating registers every fifteen minutes, then overwriting into the holding registers, continues throughout the day, printing FM15, FM30, FM6HR, and FM24HR reports as appropriate.

The periodic reports are generated automatically by the DMS at specified times, with the exception of the FM15 and TO15, which require manual initiation of their printing through a TTY command. For further details, refer to Chapter 8, "ACD TTY commands, queries, and reports."

The FM30 periodic reports print automatically every 30 minutes, on the hour and half hour. If 15-minute reports have been requested, four FM periodic reports print at the FADS TTY at the system start-of-day. These are the 15- and 30- minute reports and the 6- and 24-hour summaries.

Under the following conditions, the four FM periodic reports would take more than 15 minutes to print:

- All transfer types (XFR1, XFR2, and DA) are active.
- Table CLASSNAM is datafilled with the maximum of 15 entries.
- More than seven traffic offices are datafilled.
- The printer speed is 300 baud.

If the above conditions exist, it is recommended that the optional 15-minute reports not be requested at TOPS MPX start-of-day, or that the 1200 baud capability be used for the FADS.

Information contained in the FM and TO periodic reports

All of the periodic reports contain the FM statistics listed in Table 4-5.

Table 4-5 Force management statistics	
Statistic	**Explanation**
IPS	Initial position seizure
WV-CCS	Work volume CCS
ANS	Average speed of answer
CW-CCS	Calls-waiting CCS
AWT	Average work time
AOP	Average occupied positions
%OCC	Percent occupancy
XFR OUT	Calls transferred to a transfer operator (only appears if the call transfer feature is active in the office)
%XFR	Percentage of transfer calls in relation to nontransfer calls (appears only if the call transfer feature is active in the office)

Note 1: AOP is converted to board hours (BDH) in the FM6HR, FM24HR, TO6HR, and TO24HR reports.

Note 2: The following statistics apply to the optional enhanced MFADS feature:

RPS   Recall position seizure (if TOPS_PEG_MODE is set to PS)
TPS   Transfer position seizure (if TOPS_PEG_MODE is set to PS)
PS   Position seizure (IPS + RPS + TPS)

All of the periodic reports start with a header that specifies the type of report, the time period covered, the date, and the actual number of scans made by the DMS during the time period. For illustrations of the FM and the TO periodic reports, refer to Chapter 8, "ACD TTY commands, queries, and reports."

Refer to Table 4-6 and Table 4-7 for details on what appears on the periodic reports for a single-traffic and multitraffic office and how the information is calculated. Refer to Table 4-8 on page 4-26 for enhanced MFADS calculations for each traffic office queue type, for each traffic office, for the system, and for each system-level queue type.

The individual traffic office FM statistics are defined and derived in exactly the same way as those for the entire TOPS MPX:

- The same scan rate applies.

- The same measurement definitions apply.

- The same mathematics are used to obtain calculated values.

- The same rounding of XCS to CCS applies.

WV-CCS and AOP are rounded when printed in the periodic reports. AOP is rounded to the nearest one-tenth of a position by traffic office and by TOPS MPX. For this reason, the sum of WV-CCS, AOP, or ANS for each traffic office may differ slightly from the number shown for the entire TOPS MPX. This is not a mistake; the design provides the most accurate data for both the individual traffic office and the total TOPS MPX.

How the information in the periodic reports is derived

Tables 4-6 and 4-7 list all of the fields in the FM and TO periodic reports for single-traffic and multitraffic offices and explain how the value in each field is calculated.   If enhanced MFADS is implemented, the field values may be computed differently. Table 4-8 on page 4-26 illustrates enhanced MFADS calculations for each traffic office queue type, each traffic office, the system, and each system-level queue type.

Initial position seizures value in the periodic reports

Currently, neither the system (SYST) IPS total nor the CAMA/non-CAMA system IPS totals in the periodic reports include recalls or delay calls. Within the 6- and 24-hour call type summaries, recalls and delay calls do appear and are pegged for the IPS count if datafilled in Table CLASSNAM. If delay and recall are datafilled in Table CLASSNAM, the delay and recall

entries appear in the call type and study data summaries and are pegged. When call type summaries (with recalls and delay calls included in call type summary totals) are manually calculated and compared with the system IPS total (in which recalls and delay calls are *not* included), the total call type summaries equal more than the system IPS values.

Work volume value in the periodic reports

WV is generated when an occupied position is handling a call (CBWV) or is otherwise unavailable to handle a new call (NCWV). CBWV is pegged against particular call types and is included in the SYST WV-CCS. CBWV is also included as part of the non-CAMA and CAMA totals. For operators who can handle only nontransfer (general and CAMA) calls, NCWV is pegged against nontransfer totals, and the system total, but is not included in the non-CAMA or CAMA totals. Refer to "Call transfer statistics" on page 5-21 for information about WV statistics generated when operators are capable of handling transfer calls. SYST total WV includes CBWV and NCWV. Non-CAMA and CAMA totals include only CBWV.

Because CBWV is generated for all calls, delay call and recall WV are also included in the CBWV generated for SYST, non-CAMA, and CAMA WV-CCS. The call type AWT and WV totals do not necessarily include all call types, especially delay and recall calls.

Manually calculating the AWT totals and WV totals can show a difference between the call type and the system totals as follows:

- Call type WV/AWT includes only CBWV for the call types datafilled in Table CLASSNAM.
- The system total WV includes NCWV and CBWV for all call types (including delay and recall WV).

Manually calculating all call type WV would include CBWV only for those call types and could show a difference between non-CAMA and CAMA WV (which also includes delay and recall WV) and the manually calculated call type WV (if it does not include delay and recall WV). The calculated AWT and %OCC values may differ, because the WV value is used in calculating these statistics.

Table 4-6
Calculating field values for the current MFADS periodic reports, single-traffic office (FORMAT1/FORMAT1A)

Item	System portion of the FM periodic report	Non-XFR portion of the FM periodic report	XFR1 portion of the FM periodic report
IPS	Item 1 All calls marked as any transfer type at the time the IPS was pegged.	Item 2 Any call marked as non-XFR at the time the IPS was pegged.	Item 3 Any call marked as XFR1 at the time the IPS was pegged.
WV-CCS	Item 4 WV (CBWV + NCWV in CCS) accumulated by all operators.	Item 5 CBWV (tallied in CCS when calls marked as non-XFR had their WV pegged) + NCWV in proportion to the percentage of time operators spent handling non-XFR calls versus other XFR call types in their combined profile.	Item 6 CBWV (tallied in CCS when calls marked as XFR1 have their WV pegged) + NCWV in proportion to the percentage of time operators spent handling XFR1 calls versus other XFR call types in their combined profile.
ANS	Item 7 Item 10 / Item 1 (Adjusted for actual number of scans in the period.)	Item 8 Item 11 / Item 2 (Adjusted for actual number of scans in the period.)	Item 9 Item 12 / Item 3 (Adjusted for actual number of scans in the period.)
CW-CCS	Item 10 Calls-waiting seconds for any call waiting in any queue for operator answer (converted to CCS).	Item 11 Calls-waiting seconds for any call waiting in the non-XFR queue for operator answer (converted to CCS).	Item 12 Calls-waiting seconds for any call waiting in the XFR1 queue for operator answer (converted to CCS).
AWT	Item 13 Item 4 / Item 1	Item 14 Item 5 / Item 2	Item 15 Item 6 / Item 3
AOP	Item 16 Occupied position time accumulated by all operators (CBWV + NCWV + IDLT) divided by the number of seconds in the period.	Item 17 Occupied position time accumulated by operators (CBWV + NCWV + IDLT) handling calls from the non-XFR queue divided by the number of seconds in the period.	Item 18 Occupied position time accumulated by operators (CBWV + NCWV + IDLT) handling calls from the XFR1 queue, divided by the number of seconds in the period.

-continued-

Table 4-6
Calculating field values for the current MFADS periodic reports, single-traffic office (FORMAT1/FORMAT1A) (continued)

Item	System portion of the FM periodic report	Non-XFR portion of the FM periodic report	XFR1 portion of the FM periodic report
%OCC	Item 19 Using the WV and IDLT statistics (in seconds) for the entire system: [(CBWV+NCWV)/ (CBVW+NCWV+IDLT)] X 100	Item 20 Using the WV and IDLT statistics (in seconds) for non-XFR positions. [(CBWV+NCWV)/ (CBVW+NCWV+IDLT)] X 100	Item 21 Using the WV and IDLT statistics (in seconds) for XFR1 positions. [(CBWV+NCWV)/ (CBVW+NCWV+IDLT)] X 100
XFR OUT	Item 22 N/A	Item 23 N/A	Item 24 Calls transferred to XFR1 operators.
%XFR	Item 25 N/A	Item 26 N/A	Item 27 Item 24 / Item 2
End			

Note: FM statistics for XFR2 and DA are calculated in the same manner as those for XFR1, as shown in the previous table.

Table 4-7
Calculating field values for the current MFADS periodic reports, multitraffic office (FORMAT1/FORMAT1A)

	System-wide portion of the periodic report	
Item	**System data**	**Traffic office (TO) data**
IPS	Item 1 Sum of TO IPS in Item 2.	Item 2 Any call marked as any transfer type when IPS is pegged. Provided for each traffic office.
WV-CCS	Item 3 Sum of TO WV seconds in Item 4 (in CCS).	Item 4 WV (CBWV + NCWV in CCS) accumulated by all operators in each TO.
ANS	Item 5 Item 7 / Item 1	Item 6 N/A
CW-CCS	Item 7 Calls-waiting seconds for any call waiting in any queue for operator answer (in CCS).	Item 8 N/A
AWT	Item 9 Item 3 / Item 1	Item 10 Item 4 / Item 2
AOP	Item 11 Sum of TO AOP in Item 12.	Item 12 Occupied position time for all queues, divided by the number of seconds in the period: (CBWV + NCWV + IDLT) / Seconds in the period Provided for each TO.
%OCC	Item 13 Using the WV and IDLT statistics (in seconds) for the entire system: [(CBWV+NCWV)/(CBVW+NCWV+IDLT)]X 100	Item 14 Using the sum of the WV and IDLT statistics (in seconds) for all queues for each TO: [(CBWV+NCWV)/(CBVW+NCWV+IDLT)]X 100
	-continued-	

Table 4-7
Calculating field values for the current MFADS periodic reports, multitraffic office (FORMAT1/FORMAT1A) (continued)

	Non-XFR portion of the periodic report	
Item	**System data**	**Traffic office (TO) data**
IPS	Item 1 Sum of TO IPS in Item 2.	Item 2 Calls marked as non-XFR at the time an IPS is pegged.
WV-CCS	Item 3 Sum of TO WV seconds in Item 4 (in CCS).	Item 4 CBWV (tallied when calls marked as non-XFR have their WV pegged) + NCWV in proportion to the percentage of time operators spent handling non-XFR calls versus other XFR call types in their combined profile. Provided for each TO (in CCS).
ANS	Item 5 Item 7/ Item 1	Item 6 N/A
CW-CCS	Item 7 Calls-waiting seconds for calls waiting in the non-XFR queue for answer (in CCS).	Item 8 N/A
AWT	Item 9 Item 3 / Item 1	Item 10 Item 4 / Item 2
AOP	Item 11 Sum of TO AOP in Item 12.	Item 12 Average number of positions occupied while serving the non-XFR queue, using the WV and IDLT accumulated against that queue. (CBWV + NCWV + IDLT) / Seconds in the period Provided for each TO.
%OCC	Item 13 Using the WV and IDLT statistics (in seconds) for non-XFR positions: [(CBWV+NCWV)/ (CBVW+NCWV+IDLT)] X 100	Item 14 N/A
	-continued-	

Table 4-7
Calculating field values for the current MFADS periodic reports, multitraffic office (FORMAT1/FORMAT1A) (continued)

	XFR1, XFR2, and DA portion of the periodic report	
Item	**System data**	**Traffic office (TO) data**
IPS	Item 1 Sum of TO IPS in Item 2.	Item 2 Calls marked as XFR1 or XFR2 at the time an IPS is pegged.
WV-CCS	Item 3 Sum of TO WV seconds in Item 4 (in CCS).	Item 4 CBWV (tallied when calls marked as XFR1 or XFR2 have their WV pegged) + NCWV for each operator in proportion to the number of transfer types in the combined profile. Provided for each TO (in CCS).
ANS	Item 5 Item 7 / Item 1 (Adjusted for actual number of scans in the period.)	Item 6 N/A
CW-CCS	Item 7 Call waiting seconds for any call waiting in the XFR1 or XFR2 queue for answer (in CCS).	Item 8 N/A
AWT	Item 9 Item 3 / Item 1	Item 10 Item 4 / Item 2
AOP	Item 11 Sum of TO AOP in Item 12.	Item 12 Average number of positions occupied while serving the XFR1 or XFR2 queue, using the WV and IDLT accumulated against that queue. (CBWV + NCWV + IDLT) / Seconds in the period Provided for each TO.
	-continued-	

Table 4-7
Calculating field values for the current MFADS periodic reports, multitraffic office (FORMAT1/FORMAT1A) (continued)

	XFR1, XFR2, (and DA, if applicable), portion of the periodic report	
Item	**System data**	**Traffic office (TO) data**
%OCC	Item 13 Using the WV and IDLT statistics (in seconds) XFR1 or XFR2 positions: [(CBWV+NCWV)/(CBVW+NCWV+IDLT)]X 100	Item 14 N/A
XFR OUT	Item 15 Sum of TO data in Item 16.	Item 16 Number of calls transferred to XFR1 or XFR2 operators. Provided for each TO.
%XFR	Item 17 Item 15 divided by the sum of the non-XFR IPS.	Item 18 N/A
	End	

Impact of enhanced MFADS on FM statistics

Enhanced MFADS affects the generation of FM statistics because measurements can be IPS-based or PS-based. In addition, four levels of statistics can be generated for these data:

- statistics by queue type, for each traffic office
- traffic office totals
- system totals
- system totals according to queue type

The enhanced MFADS feature calculates the data and configures it based on calculations for each level. Either IPS- or PS-based measurements can be used in the calculations, depending on whether parameter TOPS_PEG_MODE in Table OFCENG is set to IPS or PS.

Enhanced MFADS calculations are illustrated in Table 4-8, except for system totals per queue type. These statistics can be generated by adding the measurements for each queue type (over all traffic offices), and applying the equations listed under per queue type statistics.

Table 4-8
Calculating field values for the enhanced MFADS periodic reports (FORMAT2)

Item	Per queue type, per traffic office	Per traffic office	System
WV	(1Q) $CBWV + NCWV$	(1T) Sum of (1Q) over all queue types	(1S) Sum of (1Q) over all traffic offices
AOP	(2Q) $$\frac{CBWV + NCWV + IDLT}{MFADS\ period}$$	(2T) Sum of (2Q) over all queue types	(2S) Sum of (2Q) over all traffic offices
BDH	(3Q) $$\frac{CBWV + NCWV + IDLT}{3600}$$	(3T) Sum of (3Q) over all queue types	(3S) Sum of (3Q) over all traffic offices
%OCC	(4Q) $$\frac{WV}{WV + IDLT}$$	(4T) $$\frac{(1T)}{(1T) + team\ IDLT}$$	(4S) $$\frac{(1S)}{(1S) + system\ IDLT}$$
AWT	(5Q) $$\frac{WV}{Either\ adjusted\ IPS\ or\ PS}$$	(5T $$\frac{(1T)}{(sum\ of\ team\ IPS\ or\ PS)}$$	(5S) $$\frac{(1S)}{(sum\ of\ system\ IPS\ or\ PS)}$$
ANS	(6Q) $$\frac{CW \times 10}{Either\ adjusted\ IPS\ or\ PS}$$	(6T) N/A	(6S) per queue $$\frac{System\ CW \times 10}{Either\ adjusted\ IPS\ or\ PS}$$

QMS measurements

TOPS QMS provides basic force management statistics produced by the DMS for monitoring the performance of QMS. This feature collects measurements against four different criteria:

- traffic office
- TOPS QMS queue
- TOPS QMS service
- TOPS QMS force management call class

Traffic office measurements

With this feature, each team datafilled in the DMS has measurements pegged against it. These measurements are printed at three FM devices: the QMFADS TTY, the QFADS TTY, and the QTADS TTY. These devices are similar to the corresponding devices described in Chapters 7 and 8: MFADS, FADS, AND TADS. When used with QMS, they are designated QMFADS, QFADS, and QTADS.

The following measurements are reported:
- initial position seizures (IPS): the number of calls initially routed to operators in a particular team
- recall position seizures (RPS): the number of recalls routed to operators in a particular team
- transfer position seizures (TPS): the number of transfer calls routed to operators in a particular team
- call-busy work volume (CBWV): the amount of call work volume generated by operators in a particular team
- noncall work volume (NCWV): the amount of time operators in a particular team spent in a made-busy or calls-withheld state
- idle time (IDLT): the amount of time operators in a particular team spent not made busy or calls withheld, but with no call at the position
- average work time (AWT): the amount of call-busy work volume generated by operators in a particular team divided by the number of total position seizures generated by calls routed to operators in that team. The formula for this calculation is CBWV / (IPS + RPS + TPS).
- average occupied positions (AOP): the average number of operators at position in a particular team during a period
- percent occupancy (%OCC): the percentage of time that operators on a team were unable to accept new calls

The QMFADS report includes the base measurements needed for AWT, AOP, and %OCC calculations: AOP idle time (AOPIDLT) and AOP work

volume (AOPWV). The actual AWT, AOP, and %OCC calculations are not printed at the QMFADS TTY.

Queue measurements

All QMS call queues can have measurements pegged against them. These measurements are printed at QMFADS, QFADS, and QTADS devices. The following measurements are included:

- the number of IPS made by calls assigned to each queue

    Note: A call may be assigned to a queue type without actually being queued. If a TOPS call arrives when there are idle operators capable of servicing the call, the call is immediately routed to an operator position without being queued. However, even when this happens, the system internally tracks which queue the call would have been placed in if no idle operators had been available.

- the number of RPS made by calls assigned to each queue
- the number of TPS made by calls assigned to each queue
- the amount of CBWV accumulated by calls assigned to each queue

    Note: While a call is at a position, CBWV is generated against the queue from which it came to that position. For instance, assume that a call is initially assigned to queue 1 and then receives operator service for 30 seconds. Then the call is released from position and is assigned to queue 2. The call then reaccesses a position for 30 seconds and is released. The time the call spent at position after being assigned to queue 2 is pegged against the work volume for queue 2. CBWV is always pegged against the last queue to which a call was assigned before it accessed or reaccessed the position.

- AWT (the CBWV associated with the queue, divided by the total position seizures associated with the queue)
- CW (the total amount of time calls spent waiting in each queue)
- average answer (ANS): the average amount of time it took for an operator to answer a call from a particular queue

The ANS time calculation is not sent to the QMFADS device. Instead the QMFADS TTY receives the base measurements that can be used to make the calculation.

Call class measurements

This feature also prints the following measurements for up to 15 operating company-defined QMS FM call classes at QFADS and QTADS devices. QMS FM call classes are defined in Table TQCLSDEF.

- IPS: the number of initial position seizures generated by each QMS FM call class

- RPS: the number of recall position seizures generated by calls of each QMS FM call class
- TPS: the number of transfer position seizures generated by calls of each QMS FM call class
- CBWV: the amount of call work volume
- AWT: the average work time generated by a call belonging to a particular call class

TOPS QMS may have up to 2047 distinct force management call types. However, reporting the IPS, RPS, TPS, CBWV, and AWT for all 2047 possible call types every 15 minutes would require enormous bandwidth and would take far too long to print. Therefore, in order to conserve bandwidth, this feature provides a mechanism to reduce the call types down to 15 distinct call classes. A sixteenth call class, UNDEFINED, is reserved for calls not associated with a class.

Reducing the number of call types involves two steps:
1   naming QMS force management call classes (in Table TQCLSNAM)
2   mapping QMS force management call types into QMS force management call classes (in Table TQCLSDEF)

For information about datafilling these tables, see *TOPS MPX Translations Guide*, 297-2291-350.

Position seizures, work volume, and AWT

TOPS QMS calculates AWT by dividing the amount of call busy work volume by the total number of position seizures: CBWV / (IPS+RPS+TPS). In contrast, non-QMS TOPS calculates AWT by dividing the *total* work volume (that is, the call busy work volume plus non call work volume) by *only* the number of IPS. The QMS method of calculating AWT provides a significantly smaller AWT than the non-QMS method provides.

> *Note:* In non-QMS systems, switches equipped with enhanced MFADS also have the option of calculating AWT by the CBWV / (IPS+RPS+TPS) method. (STATSPAC is not available with QMS.)

More than one position seizure may be associated with each call. Different position seizures associated with the same call may be associated with different traffic offices and different queues. For example, a call is assigned to queue 1. The call is serviced for 30 seconds by an operator in team A and released from the position. The call is then assigned to queue 2 and recalls to an operator in team B. The operator in team B services the call for 20 seconds and then releases it. Figure 4-1 shows the sequence of events.

Figure 4-1xxx
Multiple position seizures
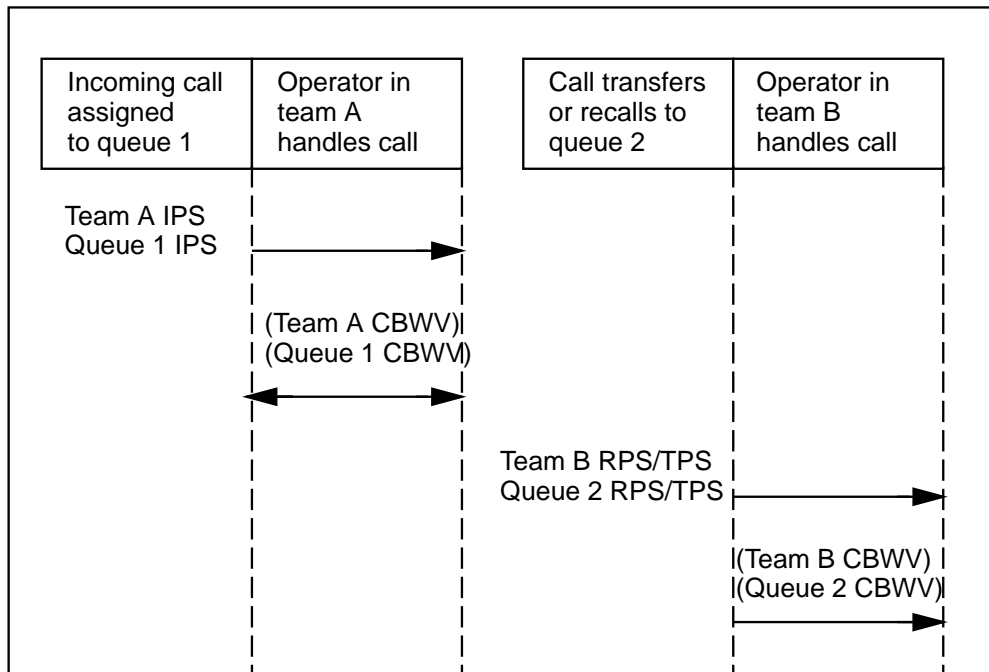
With QMS, the 30 seconds the call spent being serviced by the operator in team A after being assigned to queue 1 would be pegged against the work volume for team A and queue 1. In addition, since team A was the first queue to which the call was assigned, an IPS would be pegged against team A and queue 1.

The 20 seconds the call spent being serviced by the operator in team B after being assigned to queue 2 would be pegged against the work volume of team B and queue 2. Since the call was transferred or recalled to queue 2 and then serviced by team B, a TPS or RPS would be pegged against team B and queue 2.

Figure 4-2 provides a sample AWT calculation using two teams and two queues.

Figure 4-2xxx
Sample AWT calculation

$$\frac{\text{Team A CBWV}}{\text{Team A IPS + Team A RPS + Team A TPS}} = \frac{30 \text{ seconds}}{1 + 0 + 0} = 30 \text{ seconds}$$

$$\frac{\text{Team B CBWV}}{\text{Team B IPS + Team B RPS + Team B TPS}} = \frac{20 \text{ seconds}}{0 + 1 + 0} = 20 \text{ seconds}$$

$$\frac{\text{Queue 1 CBWV}}{\text{Queue 1 IPS + Queue 1 RPS + Queue 1 TPS}} = \frac{30 \text{ seconds}}{1 + 0 + 0} = 30 \text{ seconds}$$

$$\frac{\text{Queue 2 CBWV}}{\text{Queue 2 IPS + Queue 2 RPS + Queue 2 TPS}} = \frac{20 \text{ seconds}}{0 + 1 + 0} = 20 \text{ seconds}$$

Note: The basic QMS statistics feature does not use NCWV to figure AWT.

Pegging position seizures and work volume

If a call extends over the bounds of a 15-minute report period, the associated WV and often the associated position seizure are pegged during the terminating report period, even though the call arrived during the previous report period. The AWT calculations also use data that is pegged during this period.

IDLT and NCWV generated by an operator are pegged at the end of the idle period or the position busy period, respectively. Therefore, if a period of continuous idle time spans more than one accumulation period, all the idle time generated is pegged against the last period. Similarly, a continuous period of NCWV accumulation is all pegged against the period in which the accumulation terminates.

Calculating AOP and %OCC

With QMS basic statistics, AOP is calculated by summing up the total WV and IDLT generated by operators at position during a measuring period and then dividing by the measuring time.

%OCC is calculated by dividing the total WV by the sum of the total WV and the total IDLT.

Because CBWV, NCWV, and IDLT are pegged at the end of the call work period, non-call work period, or idle period, respectively, large time accumulations may be pegged during a single QMS force management period. For example, if an operator is idle for 20 minutes and receives a call three minutes into a particular QMS force management period, all 20 minutes of idle time are pegged against that period and no idle time is pegged against the previous period. This type of pegging can lead to large discrepancies in AOP and %OCC calculations.

Therefore, at the end of each 15-minute period, QMS force management calculates the total WV and IDLT generated by each team during the period, even if operators are still in the middle of a work period or idle period. This measurement is used solely for measuring AOP and %OCC. These special WV and IDLT measurements are referred to as average occupied position work volume (AOPWV) and average occupied position idle time (AOPIDLT), respectively. This data does not usually equal the WV and IDLT data output by QFADS and QTADS reports. It is printed as special AOP- and %OCC-specific WV and IDLT fields in the QMFADS reports.

The NCWV, CBWV, and IDLT fields printed by QMFADS, QFADS, and QTADS devices should not be used to calculate AOP and %OCC. Such a calculation would not necessarily yield the correct result.

Pegging units and rounding

IDLT, NCWV, and CBWV are pegged in units of tenths of seconds, but before the totals are printed they are rounded to the nearest second. CW time is also pegged in tenths of seconds and rounded to seconds before being output.

AWT and average answer are calculated from the CBWV and CW *before* the CBWV and CW are rounded to the nearest second. Therefore, it is possible, especially when few calls are processed in a report period, for the output AWT not to equal the result of the output CBWV divided by the total position seizures. For instance, if one call arrived at a position during a period and remained at the position for 18.6 seconds, the AWT for the period would be 18.6, even though the CBWV output for the period was 19.

QMS basic statistics calculations

Table 4-9 provides the calculations behind the basic QMS force management statistics.

Table 4-9 QMS basic statistics calculations	
Item	**Calculation**
WV	CBWV + NCWV
AOP	$\dfrac{\text{AOPWV} + \text{AOPIDLT}}{\text{QMS FM PERIOD}}$
%OCC	$\dfrac{\text{AOPWV}}{\text{AOPWV} + \text{AOPIDLT}}$
AWT	$\dfrac{\text{CBWV}}{\text{IPS} + \text{RPS} + \text{TPS}}$
ANS	$\dfrac{\text{CW}}{\text{IPS} + \text{RPS} + \text{TPS}}$

Force management features

This chapter describes the following force management (FM) features, which can be activated and deactivated by issuing commands at a teletypewriter (TTY):

- operator feedback system
- operator study data system
- call transfer
- controlled traffic

Note 1: The terms *transfer 3*, *XFR3*, and *XFR DA* are used interchangeably throughout this document. They all mean the same thing. Most of the customer data tables refer to XFR3; however, TTY periodic reports list statistics for the XFR3 queue as XFR DA statistics. The XFR3 queue is generally used for directory assistance (DA) call management in offices that are not DA-only offices.

Note 2: The force management features described in this chapter apply to the TOPS ACD system. The Queue Management System (QMS) does not support time and charges or hotel TTY state control group features. In the case of operator feedback, operator study data, broadcast messages, and password administration, the QMS software is similar, but the commands differ. Commands are discussed in Chapter 9, "QMS TTY commands, queries, and reports." In QMS, call transfer and controlled traffic are handled through the MAP (Maintenance and Administrative Position). QMS does not support STATSPAC.

Operator feedback

TOPS MPX has an online individual operator feedback system. A pair of software registers are provided in DMS memory for each operator. Software registers are associated with operators and operator positions through Table TOPSPOS and Table OPRDAT.

The DMS associates the pair of feedback registers corresponding to the logged-on operator number with the position at which the operator is logged on. One register accumulates position seizure information; a second register accumulates work volume usage for that position; a third register accumulates idle time.

When the optional feature enhanced mechanized force administration data system (enhanced MFADS) is implemented, the registers collect either initial position seizure (IPS), transfer position seizure (TPS), and recall position seizure (RPS) information, or IPS information only. This option is based on the decision to datafill TOPS_PEG_MODE in Table OFCENG with either IPS or position seizure (PS).

Note: Whenever this chapter refers to "IPS (or PS)," read IPS if your operating company uses the optional MFADS feature. Read "PS" if you use the optional enhanced MFADS feature.

Each operator is identified to the DMS by an operator logon procedure. When an operator leaves the position (unplugs the headset), the DMS ceases to accumulate position seizure information and work volume.

When an operator returns to any position, the logon process is repeated and the DMS reconnects those feedback registers to the logged-on position. In this way, the registers accumulate the operator's total-day IPS or PS and work volume. The accumulation is based on a correlation of the numbered registers with various positions at which the operator has worked throughout the day.

The DMS automatically initializes all individual operator feedback registers daily, at the system start-of-day.

The feedback data consist of the operator's accumulation of IPS or PS and the calculated average work time (AWT) value for the operator. The system AWT can also be displayed if Table OFCVAR parameter TOPS_DISPLAY_AWT is set to Y.

The DMS calculates AWT whenever an onscreen display or TTY feedback is requested for an operator. The calculation is shown rounded to the nearest whole number and is taken from the operator's register contents.

Note: TOPS MPX does not allow operators to see their feedback on the operator position screen.

TTY commands

The operator feedback feature is administered through the three TTY commands defined in Table 5-1.

Table 5-1 Operator feedback TTY commands	
Command	**Purpose**
FD	Prints the feedback data for a specific operator
FI	Prevents an operator from zeroing out the feedback registers
FZ	Allows an operator to zero out the feedback registers

For further details on the TTY commands, refer to Chapter 8, "ACD TTY commands, queries, and reports."

Operator feedback guidelines

This section provides guidelines for interpreting operator feedback data.

Statistical reliability of average work time

An individual operator's AWT is affected by the type of calls routed to the operator position. The distribution of calls by type is outside the operator's control.

Specifically, the following factors influence the AWT:

- length of time an operator has been accumulating feedback data
- percent occupancy

   Note 1: In a short period of time, the operator can receive a disproportionate number of short or long work time calls.

   Note 2: Percent occupancy (%OCC) of each operator rises as the team size increases.

Since the distribution of service times varies significantly from installation to installation, this chapter does not specify, for all TOPS MPX, the number of hours of IPS or PS that are sufficient to provide statistically reliable AWT for the individual operator. This variance has a critical impact on the statistical reliability of AWT.

The system AWT shown on the operator feedback report (if Table OFCVAR parameter TOPS_DISPLAY_AWT is set to Y) is subject to less variation in reliability, since all calls handled in the TOPS MPX are included in the calculation of AWT. The hours worked by an operator may not coincide with those used as the base for the calculation of the system AWT (from the system start-of-day each day to the time a request is made for a printout of the data). The extent to which call mix varies throughout the day, and the variation of individual call type holding times according to the time of day, influence the validity of comparisons between an individual operator AWT and the corresponding system AWT.

Trending operator feedback data

In trending feedback data, operators and managers can compare the operator's current performance with the following:

- operator's previous performance
- objectives resulting from joint target-setting sessions with the manager
- average performance of the group

Comparisons between the individual operator and system AWT should be made with the following considerations:

- the statistical considerations discussed in the previous section, "Statistical reliability of average work time"
- change in the mix of calls throughout the day (can have significant impact on the AWT and comparisons should be made for similar time periods)

The system and traffic office AWT for a time period similar to that worked by an operator can be derived from several sources:

- FM6HR periodic reports
- operator feedback message, including optionally available system AWT in the feedback message
- manual calculation

  Note: The operator feedback message value is calculated using data continuously calculated from the start-of-day, and it may not always provide as accurate a comparison as the other sources listed here.

If manual calculation is used to derive the office (or system) AWT for the same period as that worked by an operator, add the work volume hundred call seconds (CCS) and the IPS or PS for the appropriate half hours, and divide the sum of work volume (multiplied by 100) by the sum of IPS or PS. The operator productivity ratio (OPR) emphasizes self-competition and provides a reliable standard by which improvements can be recognized. It is calculated using the following formula:

$$\frac{\text{Operator (or system) AWT}}{\text{Individual operator AWT}} = \text{OPR}$$

Example:
43 / 38 = 1.13

Figures 5-1 and 5-2 show an example of a form that could be used for recording operator feedback data. Either operator AWT or OPR can be trended on the scaled reverse side of the form. This procedure can be done on a monthly or weekly basis as appropriate.

A monthly or weekly weighted AWT is derived from several total-day operator feedback accumulations, as shown in the following example:

```
Example:
                  WV
   IPS  AWT    seconds
   480  / 36   = 17,280
   446  / 35   = 15,610
   509  / 34   = 17,306      Weighted AWT: 83,269 / 2,394 = 34.8
   467  / 35   = 16,345
   492  / 34   = 16,728
   _____   _____
   2,394        83,269
```

A monthly or weekly weighted OPR is calculated from several total-day ratios, as shown in the following example:

```
Example:
                    WV
   IPS   AWT     seconds
   480  / 1.06   = 508.80
   446  / 1.06   = 472.76
   509  / 1.09   = 554.81     Weighted OPR: 2,562.75 / 2,394 = 1.07
   467  / 1.06   = 495.02
   492  / 1.08   = 531.36
   _____   _____
   2,394        2,562.75
```

Note: When the enhanced MFADS feature is implemented with PS-based measurements, the IPS column contains PS measurements instead of IPS as illustrated.

Figure 5-1
Basic operator feedback form (front)

TOPS Individual Operator Feedback

Operator_____   Office_____

Group Mgr_____   Year_____

Date	Time	Number of IPS	Operator AWT	Office AWT (FADS)	O.P.R Office AWT Operator AWT

Figure 5-2
Basic operator feedback form (back)

OPR.													AWT
1.44													
1.40													
1.36													
1.32													
1.28													
1.24													
1.20													
1.16													
1.12													
1.08													
1.04													
1.00													
.96													
.92													
.88													
.84													
.80													
.76													
.72													
.68													
.64													
.60													
.56													
.52													

Operator study data

The operator study data system can collect detailed productivity and efficiency data from up to 900 operators. The operational elements of the operator study data system are similar to those of the operator feedback system.

Note: With QMS, study data can be collected from up to 450 operators.

The elements are as follows:

- The DMS defines the operator number through datafill in Table OPRDAT.
- The software registers used to accumulate data are associated with the position at which the operator is working (Table TOPSPOS).
- Data cease to be accumulated when the operator leaves the position.
- Study data registers are automatically initialized (reset to zero) daily at the start-of-day.
- The contents of the study data registers are not written to magnetic tape.

There are two essential differences between the feedback and the study data system:

- The feedback system incorporates registers for the maximum coincident number of operators on the payroll during the engineered life of the installation; the study data system incorporates registers for up to 900 operators at any given time.

  Note: With QMS, study data can be collected from up to 450 operators.

- The feedback system provides accumulated measurements of operator IPS or PS and AWT; the study data system provides the same data, broken into a maximum of 15 call type groups. These call type groups (assigned in Table CLASSNAM and Table CLASSDEF) are the same as those assigned to DMS memory for controlled traffic purposes. Table 5-2 shows a typical assignment of call type groups. In this example, ten out of a possible 15 call type groups have been assigned to software registers.

  Note: In setting up controlled traffic for QMS, Tables TQCLSNAM and TQCLSDEF are the equivalents of Tables CLASSNAM and CLASSDEF. For more information on setting up controlled traffic, refer to the controlled traffic section on page 5-24.

Table 5-2
Typical assignment of call type groups

Group no.	Call type
1	Recalls (RCL)
2	411 - local DA requests
3	555 - HOM - calls from within serving NPA
4	555 - FOR - calls from outside serving NPA
5	555 - calls that are undifferentiated
6	131 - calls from other DA operators
7	141 - calls from other DA operators
8	*** - unidentified DA call type
9	Combined/undefined
10	Delay

When the enhanced MFADS feature is implemented and the parameter TOPS_PEG_MODE in Table OFCENG is set to PS, the operator TOTAL statistics displayed in the operator study register reports are modified to reflect total position seizures (IPS + TPS + RPS) rather than IPS only.

When the TOPS_PEG_MODE parameter in Table OFCENG is set to IPS, the data presented in the current operator study register reports printed at the TTY are based only on IPS.

TTY commands

The force supervisor assigns study registers to operators through commands entered at the TADS TTY. Table 5-3 lists the five TTY commands used to administer the operator study data system.

Table 5-3 Operator study data system TTY commands	
Command	**Purpose**
RA	Assigns an operator number to the operator study data system
RD	Prints an operator's accumulated study data without zeroing out the registers
RQ	Lists the operator numbers assigned to the operator study data system in each traffic office. The report content differs, depending on whether the command was entered from a FADS, TADS, or SADS TTY.
RR	Releases the study registers assigned to an operator number
RT	Applies to multitraffic office configurations only and is issued from a FADS TTY. The RT command releases all of the study data registers assigned to a given traffic office.

For further details on the TTY commands, refer to Chapter 8, "ACD TTY commands, queries, and reports."

Operator study data system guidelines

This section provides guidelines for administering the operator study data system. The operator study data system collects detailed productivity and efficiency data (IPS or PS and AWT by call type) on up to 900 operators in a TOPS MPX at any given time. It is intended as an enhancement to the operator feedback system that provides less detailed data on productivity and efficiency (total IPS or PS and AWT) for all operators in the system.

Data collection and manipulation

Each operating company or TOPS MPX installation, or both, select and label up to 15 call type groups. These groups are the same as those used in the controlled traffic feature and in the call type summaries of the 6HR and 24HR reports. Calls are scored for IPS or PS and AWT in the appropriate call type groups, in the TOTAL, or in both. These call types are datafilled in Table CLASSDEF and Table CLASSNAM. For a typical assignment of call type groups, refer to Table 5-2.

In addition, five intercept call types can be assigned:

• Int-ANIF (intercept automatic number identification failure)

- Int-cut (intercept cut-through)
- Int-ONI (intercept operator number identification)
- Int-rcl (intercept recall)
- Int-spl (intercept special)

Each call type is defined by what the subscriber dials to reach the DA operator.

The operator number (Table OPRDAT) is common to the operator logon procedure and the assignment of an operator to the study data system. The DMS accumulates the data by correlating the operator number with the registers assigned to the operator, regardless of the positions at which the operator has worked throughout the day.

Data start accumulating at the completion of each logon procedure for that operator and cease each time the operator leaves a position (unplugs the headset).

The DMS categorizes each IPS or PS into a call type group by noting the trunk group, the customer dialing pattern (such as, 0+, 0-, or 1+), or both. A peg count is registered and work volume data are accumulated in the appropriate call type group and in the total.

If the TOPS_PEG_MODE parameter in Table OFCENG is set to IPS, there are three exceptions to the procedure:

- Recalls of any type are scored for IPS and AWT in the RECALLS category (if datafilled in Table CLASSNAM) of the call type summary. Recalls are not pegged for the IPS of the call type register totals nor for the system IPS totals (system [SYST], centralized automatic message accounting [CAMA], non-CAMA) in the FM periodic reports and summaries. RECALL WV is accumulated and used to calculate the AWT for the call type register totals and is included in the AWT calculation of the system AWT totals and the work volume hundred call seconds (WV-CCS) totals.

  Note: CAMA is not an applicable call type in a TOPS MPX DA environment. It appears as a category on reports, however, (followed always by zeros) and is calculated by the system in the same way as for TOPS MP . For that reason there are references to CAMA in this chapter.

- Delay calls are scored for IPS and AWT in the DELAY category (if datafilled in Table CLASSNAM) of the call type summary. Delay calls are not pegged for the IPS of the call type register totals or for the system IPS totals (SYST, non-CAMA, CAMA) in the FM periodic reports and summaries. Delay call WV is accumulated and used to calculate the AWT for the call type register totals and is included in the AWT calculation of the system AWT totals and the WV-CCS totals.

Note: Delay calls are scored differently in QMS. In the ACD system, IPS is not pegged for delay calls except in the 6- and 24-hour summary reports, although AWT is accounted for in the 15-minute reports. In QMS, delay calls are always pegged for IPS +TPS + RPS, so work volume coincides more accurately with AWT. Refer to Chapter 4, "Force management measurement definitions," for information on how IPS is scored in the ACD system (page 4-18) and in QMS (page 4-29).

- Calls that do not fall into any of the categories selected are scored for IPS and AWT only in the system total and in the call type register totals.

Because of the routines previously described, manual addition of the individual call group IPS and work volume does not always result in the same total as that calculated and printed by the DMS.

If parameter TOPS_PEG_MODE is set to PS, one similar exception can be handled. Position seizures (IPS, TPS, and RPS) are not pegged for delay calls; however, the call-busy work volume (CBWV) associated with the delay call is pegged against the position's current queue type. In addition, a service initiation and service work volume are pegged for the current service type and the loop accessed by the delay call.

The DMS automatically initializes all study data registers once each day, at the start-of-day. The start-of-day is set in Table OFCVAR parameter TOPS_START_OF_DAY The system does not automatically initialize the assignments of operator numbers. Issuing the TTY command **RR** releases the study register assigned to an operator number and makes it available for reassignment.

Statistical reliability of average work time

The statistical reliability of an operator's overall AWT and AWT by call type is influenced by the following factors:

- Length of time an operator is assigned to the study data system. In a short period of time, the operator may receive a disproportionate number of short or long work time calls.

- Team size. The percent occupancy of each operator rises as the team size increases.

- Call mix. Even if the total sample is sufficient to ensure statistical reliability for the overall AWT, certain call types may be inadequately sampled because they represent a small percentage of the total system traffic.

- Variance in AWT by call type. Some call types are generally constant in holding time while others have a tendency to vary.

Generally, the larger the sample, the more reliable the data. As a rule, operators should not be assigned to the study data system for less than a full

day of work. It is further recommended that operators be assigned, if possible, when the team size requires a minimum of ready-to-serve time.

The system AWT shown on the operator study data report is subject to less variation in reliability, since all calls handled in the TOPS MPX are included in the calculation of AWT. The hours worked by an operator may not coincide with those used as the base for the calculation of the system AWT (from the start-of-day each day to the time a request is made for a printout of the data).

Two factors influence the validity of comparisons between an individual operator's AWT by call type and the corresponding system AWT:

- the extent to which call mix varies throughout the day
- the variation of individual call type holding times according to the time of day

Trending operator study data

Recording operator study data over a period of time increases its sample size and statistical reliability. The process reveals patterns that can serve as the basis for supplemental training, such as using controlled traffic to let an operator concentrate on a particularly difficult call type.

A form like the one shown in Figure 5-3 can be used to record study data over a period of time. The form should provide space to record operator IPS or PS by call type and AWT by call type for the operator, the system, and the traffic office. There should be a column for every call type group assigned in Tables CLASSNAM and CLASSDEF.

There should also be a space for recording the operator's scheduled tour along with any changes to the tour (for example, time off less than a day, or a change tour), since such changes can affect the call mix and the resulting AWT. A weighted AWT is derived from several samples by multiplying each sample of IPS or PS by its corresponding AWT, adding the result of each of these calculations, and dividing by the sum of IPS or PS.

Figure 5-3
Sample form for summary of operator work data

						Total										
Day	Date	Scheduled tour	Changes													
				OPR IPS												
				OPR AWT												
				SYST AWT												
				OFC AWT												
				OPR IPS												
				OPR AWT												
				SYST AWT												
				OFC AWT												
				OPR IPS												
				OPR AWT												
				SYST AWT												
				OFC AWT												
				OPR IPS												
				OPR AWT												
				SYST AWT												
				OFC AWT												
				OPR IPS												
				OPR AWT												
				SYST AWT												
				OFC AWT												

Summary of operator work data

Month: System:
Operator: Office:

Call transfer

Four call transfer capabilities are available for calls in TOPS MPX:

- transfer calls from one operator to another who is designated as a transfer operator
- route specific call types directly to a transfer calls-waiting (CW) queue
- route calls incoming over a specified trunk group directly to a specified transfer CW queue
- accumulate different statistics for different services (for example, toll versus DA)

TOPS MPX provides these call transfer capabilities to guarantee that calls requiring the services of a transfer operator are connected to positions and operators providing transfer services. For example, the transfer service might provide operators capable of speaking an alternate language.

Calls requiring transfer services are placed in the transfer queue either directly, based on the datafill, or through another operator's transferring the call by keying **Opr** + < digits> + **Start**. When a transfer operator reaches the top of the idle position queue, the system routes calls placed in the calls-waiting (CW) queue on a first-in, first-out (FIFO) basis.

Positions that can receive both transfer and nontransfer (non-XFR) calls receive these calls on a FIFO basis. When calls are being transferred or queued for unoccupied transfer positions, the Sonalert tone sounds at the in-charge position.

> *Note:* The CW display at the service assistance screen in call control group 1 indicates that the number of calls waiting to be handled is greater than the threshold value. The CD display indicates that the number of calls deflected is greater than the threshold value. For the in-charge display, X0123 indicates that calls are either waiting in queue or being deflected for a specific queue (0-3). Steady numbers indicate that calls are waiting; flashing numbers indicate that calls are being deflected.

Activating call transfer

The call transfer feature is automatically activated when one, two, or three transfer queues are assigned to the Table OFCENG parameter TOPS_TRANSFER_TYPES. After the transfer queues have been activated for the first time, they can be controlled from the SADS, TADS, or FADS TTY.

> *Note:* The DA queue can be assigned only if the DA package is present in the office.

TTY commands

Five TTY commands administer the call transfer feature. Two activate or deactivate the call transfer feature, two change the operator profile, and one queries the number of operators and their associated profiles. These commands are defined in Table 5-4.

Table 5-4
Call-transfer TTY commands

Command	Purpose
XA	Activates call transfer
XD	Deactivates call transfer
X...I	Specifies which operators can receive transfer calls, and from which queues
X...X	Prevents an operator from receiving transfer calls, either in general or from specific queues
X	Prints a list of operators in an office and the queues from which they can receive calls

Refer to Chapter 8, "ACD TTY commands, queries, and reports," for further details on the TTY commands.

Deactivating call transfer

There are two ways to deactivate call transfer:

- by entering the XD TTY command at the TADS TTY (deactivates the entire call-transfer feature)
- by removing the transfer type from the datafill of Table OFCENG parameter TOPS_TRANSFER_TYPES (deactivates that particular transfer type)

A transfer type cannot be deleted from the TOPS_TRANSFER_TYPES parameter nor can it be deactivated by the XD TTY command if a reference to the transfer type exists in any of the following tables:

- Table TOPS
- Table XFROPSEL
- Table OGTMPKEY (does not affect the XD command)
- Table VSNOPT
- Table LANGTOQ

In addition, the queue must not be referenced in parameter DEFAULT_AABS_TO_OPR_QUEUE in Table LANGTOQ.

If the transfer type has already been activated and then is deleted from Table OFCENG parameter TOPS_TRANSFER_TYPES, the transfer type is automatically deactivated.

Call transfer from one position to another

The ability to transfer calls from one operator to another was originally intended to solve language incompatibility between operator and customer. This feature enables a unilingual operator to transfer any call to a bilingual operator or to transfer certain calls to other operators in the same TOPS MPX system. The datafilled information in Table OPRDAT is modifiable through commands described in Chapter 8, "ACD TTY commands, queries, and reports," or through a DMO request to change the datafill in Table OPRDAT.

When an operator logs on to a position, the operator profile is associated with the position type. The position type can be transfer 1 (XFR1), transfer 2 (XFR2), general (GEN), transfer directory assistance (XFR DA), or any combination of these types. The position assignments are modifiable only through a DMO request to change the datafill in Table TOPSPOS. Calls are transferred to transfer positions by keying **Opr** + < digits of the desired queue > + **Start**. The service type is changed to transfer 1 or transfer 2 when the general operator presses **Opr** + < 1, 2, or 3 > + **Start**.

A call is transferred only if the combined profile of the transferring operator does not contain the appropriate transfer type. That is, an operator cannot transfer a call to another transfer operator if the first operator's combined profile contains the appropriate transfer type. For example, if operator 101 has a combined profile containing both GEN and XFR1, operator 101 must handle any GEN and XFR1 calls that arrive at that position. Operator 101 must transfer any calls that require XFR2 or XFR DA assistance. Also, a call cannot be transferred to a queue that is not active.

Call transfer based on call type

The DMS can route specific call types directly to transfer positions when the datafill in Table TOPS specifies that certain call types are to be routed to a transfer position type. During translations, a call is assigned a call-origination type, which is used to index Table TOPS to determine the type of service required. To force a special index into Table TOPS, the standard pretranslator tables must be datafilled and the pretranslator name specified in the TOPS trunk group. This feature can be used, for example, to route 411 calls directly to a specified transfer operator who has DA facilities.

When a call is routed directly to a transfer position translated using Table TOPS, the OFCENG parameter TOPS_TRANSFER_TYPES must include XFR1 to route to a XFR1 position, XFR2 to route to a XFR2 position, and XFR DA to route to a DA position. The transfer feature does not have to be activated through the TTY command.

Note: The datafill in Table OFCENG parameter TOPS_TRANSFER_TYPES cannot be removed if a reference to a particular transfer type exists in Table TOPS.

Call transfer based on trunk group

Calls can also be routed directly to transfer positions based on the trunk group over which the calls arrive. The trunk groups are assigned in Table XFROPSEL and the feature activated when Table OFCOPT parameter TOPS_SEL_XFR_OPR_TRK is set to Y. Calls that come in over a designated trunk group are routed directly to the transfer operator type designated in Table XFROPSEL only if the OFCENG parameter TOPS_TRANSFER_TYPES equals the type datafilled in Table XFROPSEL and the feature has been activated at the SADS or TADS TTY.

> *Note 1:* The XFROPSEL datafill does not override any call types datafilled in Table TOPS for calls routed directly to a transfer position. Only call types that would otherwise be routed to general operators (based on call type) are sent to a designated transfer position using the trunk group assigned in Table XFROPSEL.

> *Note 2:* The datafill in Table OFCENG parameter TOPS_TRANSFER_TYPES cannot be removed if a reference to a particular transfer type exists in Table XFROPSEL.

Setting up the operator profile

The operator profile contains two sets of information:

- the queue or queues (nontransfer, transfer 1, transfer 2, XFR DA) from which an operator can receive calls
- the service (such as DA) an operator can provide to a subscriber

This profile is assigned initially through datafill in Table OPRDAT. The operator profile can be changed at the TADS or SADS by using the X...I or X...X commands. The following paragraphs explain how to set up and change operator profiles.

After call transfer is activated, the following data tables must be datafilled to associate transfer operators with the transfer types available in that TOPS MPX:

1 The type of position an operator logs on to (GEN, XFR1, XFR2, XFR DA, all, or any combination) is assigned in Table TOPSPOS. It is recommended that all positions include GEN in the XFRSET field.

2 The type of service an operator logged on to that position can provide for subscribers (DASERV) is assigned in Table TOPSPOS.

3 The queues from which individual operators can accept calls (GEN, XFR1, XFR2, XFR DA, all, or any combination) are assigned in Table OPRDAT.

4 The type of service an operator can provide for subscribers (DASERV) is assigned in Table OPRDAT.

Up to three call transfer queues can be used, depending on the datafill in Table OFCENG parameter TOPS_TRANSFER_TYPES.

Combined transfer profile

The combined transfer profile determines the transfer queues from which a specific operator, logged on to a specific position, can receive calls.

The combined transfer profile is based on the following conditions:

- In Table OPRDAT, all operator logon numbers are assigned and associated with the transfer types (GEN, XFR1, XFR2, XFR DA, all, or any combination) that the operator can handle.
- In Table TOPSPOS, all operator positions are associated with the call queues (GEN, XFR1, XFR2, XFR DA, all, or any combination) from which the position can receive calls.

The combined transfer profile contains only the transfer types that are in both the operator and the position profiles. For example, if the position is datafilled for all three call queues, but the operator logged on to the position is datafilled only for XFR1, then the combined transfer profile contains only XFR1, and only transfer 1 calls are distributed to that position while that operator is logged on.

After initially datafilling Table OPRDAT, the in-charge manager can change the operator profile at the appropriate TTY using the commands listed in Table 5-4 on page 5-16. The position profile in Table TOPSPOS can be changed only through a DMO routine.

Operators may be assigned several logon numbers, each associated with different queues from which calls can be accepted. For example, operator 1 has two logon numbers, 100 and 200, datafilled in Table OPRDAT. Number 100 is assigned to receive calls from the GEN queue. Number 200 is assigned to receive calls from the XFR1 queue. When the operator logs on to a position (position type is GEN and XFR1, datafilled in Table TOPSPOS) with logon number 100 (GEN in Table OPRDAT), only calls from the general queue are forwarded to that position. When the operator logs on to the same position (position type is GEN and XFR1) with logon number 200 (XFR1 in Table OPRDAT), only calls from the transfer 1 queue are routed to the operator.

Assigning several logon numbers to one operator eliminates the need to constantly change the OPRDAT datafill using the commands described in the following paragraphs.

Combined service profile

The combined service profile determines the service (DA) that a specific operator, logged on to a specific position, can provide for subscribers. The combined service profile is based on the following conditions:

- In Table OPRDAT, all operator logon numbers are assigned and associated with the service type (DASERV) that the operator can handle.

- In Table TOPSPOS, all operator positions are associated with the service (DASERV) an operator can provide while logged on to that position.

The combined service profile contains only the service types that are in both the operator and the position profiles.

Table 5-5 shows how TTY entries and Table OPRDAT datafill identify transfer queues.

Table 5-5 Identifying TOPS MPX transfer queues		
TTY input	**OPRDAT datafill**	**Queue**
0	GEN	General queue
1	XFR1	Transfer 1 queue
2	XFR2	Transfer 2 queue
3	XFR DA	Transfer DA queue

The digits indicating from which queue an operator is eligible to receive calls are referred to as the *operator profile*. The operator profile can be altered from the TTY, using the X...I command. After the command is entered, the operator position screen displays the queues from which the operator can now receive calls on the Assigned Activities (position busy) screen.

Abbreviated forms of the X...I command (the transfer-only include command and the service-only include command) allow the in-charge manager to change the transfer profile or service profile from the TTY as necessary.

Refer to Chapter 8, "ACD TTY commands, queries, and reports," for further details on the TTY commands.

> *Note:* These commands can be entered only if Table OFCENG parameter TOPS_TRANSFER_TYPES equals XFR1, XFR2, XFR DA, or any combination thereof.

Call transfer statistics

TOPS MPX generates additional FM statistics in order to provide for force management (provisioning and administration) of the call transfer feature. These statistics are generated only when Table OFCENG parameter TOPS_TRANSFER_TYPES is set to XFR1, XFR2, XFR DA, or any combination of these, and the transfer type has been activated. These transfer statistics are in addition to the normal FM statistics. They appear on all of the FM periodic reports when call transfer is active in the office.

The statistics for XFR1, XFR2, and XFR DA are all derived in the same manner. When call transfer is active in the office, FM statistics are reported based on queue type as follows: non-XFR, XFR1, XFR2, XFR DA, or any combination.

The following list shows the data provided for XFR1, XFR2, and XFR DA operators:

- title
- clock hours covered in the report
- actual number of scans in the time period covered
- MULT. Multiple activations of the feature during the period covered in the report (if appropriate)
- % XFR Percentage of calls transferred. The DMS calculates this percent by dividing the total number of transferred calls by the number of calls handled by non-XFR operators
- IPS or PS. Number of calls marked as XFR1 at the time an IPS or PS (specifically TPS) call was pegged. Each call is pegged only once. Because the IPS or PS for each call is pegged just before it is released from a position, it is pegged according to the call type assigned to it when it is released. For example, if a call arrives at an operator position as a GEN call, but the operator presses the **XFR1** key to transfer the call to an XFR1 position, the IPS or PS (specifically, TPS) is pegged as an XFR1 call. If the GEN operator does not transfer the call to another position before releasing it, the call is pegged as a GEN call. If the incoming call is routed directly to an XFR1 operator, who releases the call without transferring it, the IPS or PS (specifically, TPS) is pegged as an XFR1 call.
- WV-CCS. Sum of CBWV and NCWV accumulated by those operators who can receive calls from the XFR1 queue, calculated as follows:
  - CBWV is tallied when calls marked as XFR1 have their work volume pegged. For operators serving more than one transfer type, CBWV is pegged against whatever the queue mark of the call is at the time it is pegged.

- For operators receiving only XFR1 calls (with XFR1 as the only transfer type in their combined transfer profiles), the entire NCWV is added to the WV-CCS. For operators with more than one transfer type in their combined transfer profile, both NCWV and IDLT are pegged proportionally against each queue served, based on the system-wide call mix for the previous 15-minute period.

For example, assume that on a system-wide basis for the previous 15 minute period, 9000 seconds of CBWV were accumulated against the non-XFR queue, 1000 seconds were accumulated against the XFR1 queue, and 2000 seconds were accumulated against the XFR2 queue. The system-wide work volume total is 12,000 seconds.

On average, operators with only non-XFR and XFR1 in their combined profile spent 90 per cent of their time handling non-XFR calls and ten per cent of their time handling XFR1 calls. This is determined by dividing the WV accumulated against each queue type served by the total WV accumulated for operators with a given queue profile combination, as shown in the following example.

$$\frac{9000}{9000 + 1000} \times 100 = 90\% \text{ NON-XFR WV}$$

$$\frac{1000}{9000 + 1000} \times 100 = 10\% \text{ XFR1 WV}$$

- ANS. Answer delay encountered by subscribers waiting in the XFR1 queue for operator answer. CW-XCS is accumulated through a ten-second scan of calls waiting for an operator to answer in the XFR1 queue. IPS (or PS, specifically TPS) is the number of calls marked as XFR1 at the time the call was pegged. The formula is CW divided by IPS (or PS).

   Note: Calls that are transferred and subsequently abandoned before answer from a transfer operator are excluded from the base.

- CW-CCS. Value derived from a ten-second scan of calls waiting for operator answer in the XFR1 queue.
- AWT. Average work time of XFR1 type operators. AWT is calculated by the DMS using WV-CCS and IPS (or PS).
- AOP. Occupied position time accumulated by the operators (CBWV + NCWV + IDLT) handling calls from XFR1 (or XFR2 or XFR DA) queue, divided by the number of seconds in the period.

   Note: AOP is converted to board hours in the 6-hour and 24-hour reports.

- %OCC. Percent occupancy of XFR1 type operators. Percent occupancy indicates the percentage of time logged-on operators are not available to handle new calls either because they are handling a call or because they are in make-busy mode.
- XFR OUT. Number of calls transferred to XFR1 operators.

In addition to the transfer statistics, TOPS MPX provides the following FM statistics on non-XFR operators:

- IPS (or PS). Number of calls marked as non-XFR at the time an IPS (or PS, specifically TPS) was pegged.
- WV-CCS. Sum of CBWV and NCWV accumulated by operators who can receive calls from the nontransfer queue, calculated as follows:
  - CBWV is tallied when calls marked as non-XFR have their work volume pegged. For operators serving more than one transfer type, CBWV is pegged against whatever the queue mark of the call is at the time it is pegged.
  - For operators receiving only non-XFR calls (for whom non-XFR is the only transfer type in their combined transfer profiles), the entire NCWV is added to the WV-CCS. For operators with more than one transfer type in their combined transfer profile, both NCWV and IDLT are pegged proportionally against each queue served based on the system-wide call mix for the previous 15-minute period.
- ANS. Answer delay encountered by subscribers waiting in the nontransfer queue for operator answer. CW-XCS is accumulated through a ten-second scan of calls waiting for operator answer in the nontransfer queue. IPS or PS is the number of calls marked as non-XFR at the time the IPS or PS were pegged. The formula is CW / IPS or PS.
- CW-CCS. Value derived from a ten-second scan of calls waiting for operator answer in the non-XFR queue.
- AWT. Average work time of operators who can receive calls from the GEN queue. AWT is calculated by the DMS using WV-CCS and IPS or PS as calculated in the previous items in this list.
- AOP. Occupied position time accumulated by operators (CBWV + NCWV + IDLT) handling calls from non-XFR queue, divided by the number of seconds in the period.

  Note: AOP is converted to board hours in the 6-hour and 24-hour reports.

- %OCC. Percent occupancy of non-XFR operators. Percent occupancy indicates the percentage of time logged-on operators are not available to handle new calls, either because they are handling a call or because they are in make-busy mode.

Refer to Chapter 8, "ACD TTY commands, queries, and reports," for examples of the FM periodic reports with call transfer statistics.

Controlled traffic

The controlled traffic feature allows specified operators to avoid handling certain types of calls. This feature is used during training to protect student operators from call types for which they are untrained. It may also be used with experienced operators for whom concentrated practice on certain call types is indicated. This feature is *not* for the purpose of controlling answer on one or more types of calls.

For controlled traffic purposes, a maximum of 15 call type groups can be assigned and defined in Table CLASSNAM. These call types must be consistent with the call types assigned for the system in Table TOPS. The call types assigned in Table CLASSNAM are also the same call types that are printed in the 6- and 24-hour periodic reports and the operator study data reports. For a typical assignment of call type groups, refer to Table 5-2.

> *Note:* A particular TOPS MPX installation may not handle all of the call type groups shown in the sample assignment.

In addition, six DA call types and five intercept call types can be assigned:

- 411 (local)
- 555-for (foreign NPA)
- 555-hom (home NPA)
- 555 (undifferentiated)
- 131 (inward)
- DA-rcl (recall)
- Int-ANIF (intercept ANI failure)
- Int-cut (intercept cut-through)
- Int-ONI (intercept ONI)
- Int-rcl (intercept recall)
- Int-spl (intercept special)

Each call type is defined by what the subscriber dials to reach the DA operator.

A copy of the assigned call type groups should be kept near the TTY used to enter controlled traffic commands.

When an operator in controlled traffic mode becomes available to accept a new call, the DMS searches through a specified number of calls in the calls-waiting queue (beginning with the call at the top of the queue) to find a call that is acceptable to the operator. If there is no match, the position occupied by that operator enters the idle position queue. The operating company specifies in Table OFCVAR how many calls are to be included in this search (recommended not to exceed ten). This value can be altered

through a DMO routine in Table OFCVAR parameter TOPS_CALLS_WAITING_SEARCH_DEPTH.

When a call enters the system, it routes to the most idle position, provided that the position is not associated with an operator number in a controlled traffic mode set to reject that call type. If the most idle position cannot accept the call, the system searches through the rest of the idle position queue to find an acceptable position to which to distribute the call.

Having operators in controlled traffic mode can adversely affect the efficiency of call distribution. The effect is minor when only one or two operators are relatively unrestricted and they represent a small proportion of the operating force. The effect becomes more serious as the proportion of operators in the controlled traffic mode increases, especially if they can receive only a few call types.

The proportion of logged-on operators in the controlled traffic mode to total logged-on operators should never exceed 25 percent. When the proportion of operators in the controlled traffic mode reaches 25 percent or higher, the warning `25% CT` displays on the screens of the in-charge position and the force management cathode-ray tube (FMCRT) position.

TTY commands

Table 5-6 lists the three TTY commands used to administer the controlled traffic feature.

Table 5-6 **Controlled traffic TTY commands**	
Command	**Purpose**
T...I	Directs the DMS to route only certain call types to a specified operator. This format includes specified call types in the operator's controlled traffic set. When entered with a call type of zero, this command returns the operator to normal call distribution.
T...X	Directs the DMS to route only certain call types to a specified operator. This format excludes specified call types from the operator's controlled traffic set.
T	Lists all the operators in controlled traffic mode and the numbers of the call classes in those operators' controlled traffic sets.

For further details on the TTY commands, refer to Chapter 8, "ACD TTY commands, queries, and reports."

Information on operators

The operator information commands provide supervisors with a listing of all operators currently logged on, and a listing of the status of all TOPS MPX positions in the system.

TTY commands

Table 5-7 defines the two commands used to solicit information about operators from the DMS.

Table 5-7xxx Operator information commands	
Command	**Purpose**
L	Prints a listing of all operators (including service assistants) currently logged on
P	Prints a listing of the status of all TOPS MPX positions

For further details, refer to Chapter 8, "ACD TTY commands, queries, and reports."

Administrative operator positions

This chapter describes the TOPS MPX administrative operator positions:

- the in-charge (IC) position
- the service assistance (SA) position

It defines the displays that appear on the screens and the call-processing keys that are used on the keyboards. It also explains the procedures that service assistants and IC managers follow to answer assistance requests, to page and monitor operators, and to initiate outgoing calls.

TOPS MPX does not support the force management cathode-ray tube (FMCRT) screen. In a TOPS MPX environment, the force management function should be provided through a TOPS 04 or TOPS MP position on the DMS switch. For that reason, the TOPS 04 and TOPS MP FMCRT descriptions are included in this chapter.

The last section of this chapter describes the effect of the Queue Management System (QMS) on TOPS MPX administrative screens.

Common displays

The displays defined in this section appear on more than one of the administrative screens discussed in this chapter. Wherever they appear, their meaning is the same. Displays that appear on only one type of screen are defined later in the chapter, under the discussion of that screen.

Force management displays

The displays listed in Table 6-1 are updated every ten seconds with the number of positions in those states throughout the system. These displays appear on the FMCRT (cumulatively for all teams) but do not appear on the IC position screen. They do not appear on the SA position screen.

Table 6-1xxx
Position status displays

Display	Definition
OC	Number of occupied positions for the whole system (in all traffic offices)
MB	Number of occupied positions that are in operator make-busy mode for any of the following reasons: - The headset is seated, but logon is not complete. - The operator has pressed the **Make Busy** key but is still occupied with a customer call - The operator has pressed the **Make Busy** key and is initiating a call (for example, for assistance, or a subsequent attempt) or is performing some other miscellaneous activity.
OD	Number of positions that are out of service, either because a command has been entered from the MAP (maintenance and administration) terminal, the teletypewriter (TTY), or the TOPS position controller administration and maintenance interface (TAMI) terminal, or because the DMS has automatically removed the position from service
CT	Number of positions occupied by operators who have been placed in controlled traffic mode
UCP	Number of unoccupied positions with a call in progress
UCD	Number of unoccupied positions with a call that has terminated
ACS	Number of positions that have a loop accessed but neither a calling nor a called party attached and off-hook
OC1	Number of occupied operator positions system-wide with transfer 1 in the combined transfer set (OC1 displays only when the transfer 1 queue of the call transfer feature is activated.)
MB1	Number of made-busy operator positions system-wide with transfer 1 in the combined transfer set (MB1 displays only when the transfer 1 queue of the call transfer feature is activated.)
OC2	Number of occupied operator positions system-wide with transfer 2 in the combined transfer set (OC2 displays only when the transfer 2 queue of the call transfer feature is activated.)
MB2	Number of made-busy operator positions system-wide with transfer 2 in the combined transfer set (MB2 displays only when the transfer 2 queue of the call transfer feature is activated.)
OC3	Number of occupied operator positions system-wide with directory assistance (DA) in the combined transfer set (OC3 displays only if the DA transfer type is active.)
MB3	Number of made-busy operator positions system-wide with DA in the combined transfer set (MB3 displays only if the DA transfer type is active.)

Note: The OC3 and MB3 indicators display only if there is at least one traffic office in the multitraffic office configuration that provides DA service. This applies to all statistics about the third queue (referred to as XFR3, DA, or transfer 3).

Calls-waiting displays

The indicators listed in Table 6-2 display whenever calls are waiting in a queue for an available operator. If datafill supports it, these indicators display on the FMCRT and the IC and SA position screens.

Table 6-2xxx
Calls-waiting displays

Display	Definition
CW	Displays when the ratio of calls in the non-XFR queue to occupied positions able to handle non-XFR calls reaches a predefined threshold. When the queue length subsides below a lower defined threshold, the CW indicator is erased.
CW1	Displays when the ratio of calls in the transfer 1 queue to positions occupied by transfer 1 operators reaches a predefined threshold. When the queue length subsides below a lower defined threshold, the CW1 indicator is erased. The display only occurs if the queues are activated.
CW2	Displays when the ratio of calls in the transfer 2 queue to positions occupied by transfer 2 operators reaches a predefined threshold. When the queue length subsides below a lower defined threshold, the CW2 indicator is erased. The display only occurs if the queues are activated.
CW3	Displays when the ratio of calls in the DA queue to positions occupied by DA operators reaches a predefined threshold. When the queue length subsides below the defined threshold, the CW3 indicator is erased (CW3 displays only if the DA transfer type is active).

Note: The CW3 indicator displays only if there is at least one traffic office in the multitraffic office configuration that provides DA service. This applies to all statistics about the third queue (referred to as XFR3, DA, or transfer 3).

Calls-deflected displays

The indicators listed in Table 6-3 display whenever calls are being deflected for treatment. These indicators display on the FMCRT and on the IC and SA position screens.

Table 6-3xxx
Calls-deflected displays

Display	Definition
CD	Displays when the number of queued nontransfer calls reaches a predefined threshold, and new calls are deflecting. Accompanied by the Sonalert alarm.
CD1	Displays when the number of queued transfer 1 calls reaches a predefined threshold, and new calls are deflecting. Accompanied by the Sonalert alarm. The display only occurs if the queues are activated.
CD2	Displays when the number of queued transfer 2 calls reaches a predefined threshold, and new calls are deflecting. Accompanied by the Sonalert alarm. The display only occurs if the queues are activated.
CD3	Displays when the number of queued DA calls reaches a predefined threshold, and new calls are deflecting. Accompanied by the Sonalert alarm.

Note: The CD3 indicator displays only if there is at least one traffic office in the multitraffic office configuration that provides DA service. This applies to all statistics about the third queue (referred to as XFR3, DA, or transfer 3).

Miscellaneous displays

The indicators listed in Table 6-4 display miscellaneous information about the system on the FMCRT position screen. The messages <NO ASST POS> and <POS BUSY> display on all three types of position screens.

Table 6-4xxx
Miscellaneous displays

Display	Definition
<25% CT>	Flashes when the number of positions occupied by operators in the controlled traffic mode reaches 25 percent of all occupied positions. Accompanied by the Sonalert alarm.
<All T&C POS OD>	Flashes when all T&C TTYs have been removed from service. A T&C TTY is either a voicequote (VQ) or a record (REC) TTY. Accompanied by the Sonalert alarm.
<NO ASST POS>	Flashes when no SA positions are logged on and the IC position is not in GEN mode. Accompanied by the Sonalert alarm.
<POS BUSY>	Flashes when the position is placed in POS BUSY mode. It is erased automatically when the **{Accept Calls}** soft key is pressed. Accompanied by the Sonalert alarm.
NO ST REG	Displays when all operator study data registers (number datafilled in Table OFCENG parameter TOPS_NUM_STUDY_REG) are in use.

Note: Brackets (< >) surrounding a screen display message indicate that this message flashes on the screen.

TOPS 04 FMCRT screen

In a multitraffic office, the force manager may be provided with a TOPS 04 FM CRT, to monitor the status of the office and the quality of the service being provided. Figures 6-1 and 6-2 illustrate the display screen, with and without the call transfer feature activated.

Note: Indicators on the FMCRT screen that reflect the status of DA operators, DA queues, and DA calls display only in a force management center that has at least one traffic office that provides DA service using the TOPS MP positions; otherwise, these indicators, such as OC3, MB3, CD3, and CW3, do not appear.

Figure 6-1xxx
TOPS 04 force management screen without call transfer active

```
      OC   MB   OD   CT   UCP   UCD   ACS
      142   6    1    5    1     0     3


TO     1    2    3    4    5    6   7

OC    24   17   15   32   18   25   11
MB     2    0    0    3    1    0    0
ACS    0    0    0    0    0    0    0




           <25% CT><ALL T&C POS OD>


 CW         CD          NO ST REG
```

Note: < > denotes flashing message
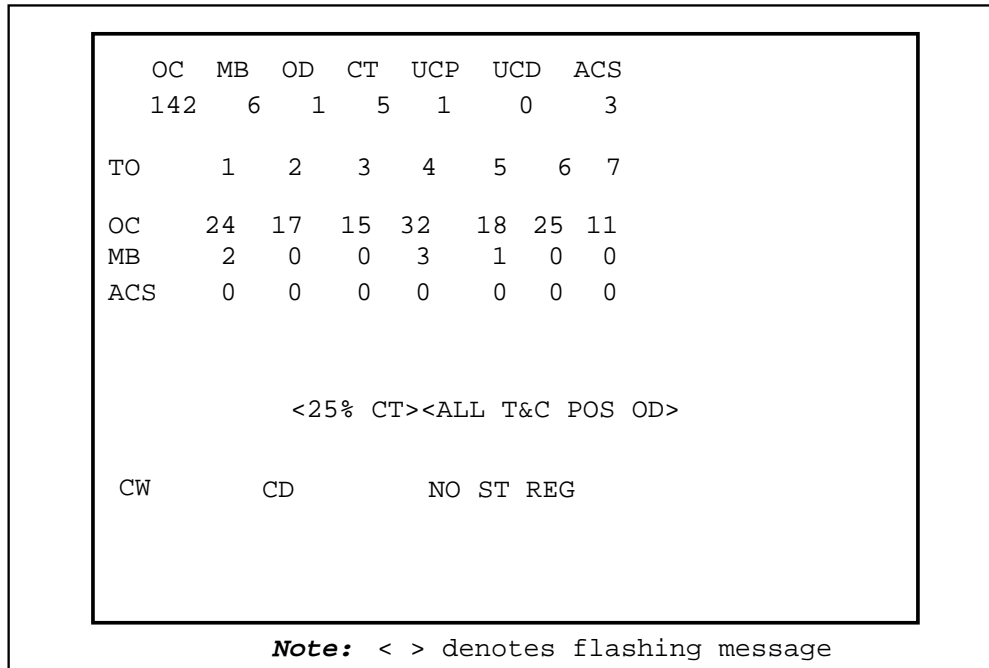
Figure 6-2xxx
TOPS 04 force management screen with call transfer active

```
    OC   MB OD   CT UCP UCD ACS OC1 MB1 OC2 MB2 OC3 MB3
    142   6  1    5   1   0   3   0   0   0   0   0   0


 TO     1  2  3  4  5  6  7

 OC    24 17 15 32 18 25 11
 MB     2  0  0  3  1  0  0
 ACS    3  0  0  0  0  0  0
 OC1    0  0  0  0  0  0  0
 MB1    0  0  0  0  0  0  0
 OC2    0  0  0  0  0  0  0
 MB2    0  0  0  0  0  0  0
 OC3    0  0  0  0  0  0  0
 MB3    0  0  0  0  0  0  0
           <25% CT><ALL T&C POS OD>

                          NO ST REG
```

Note: < > denotes flashing message
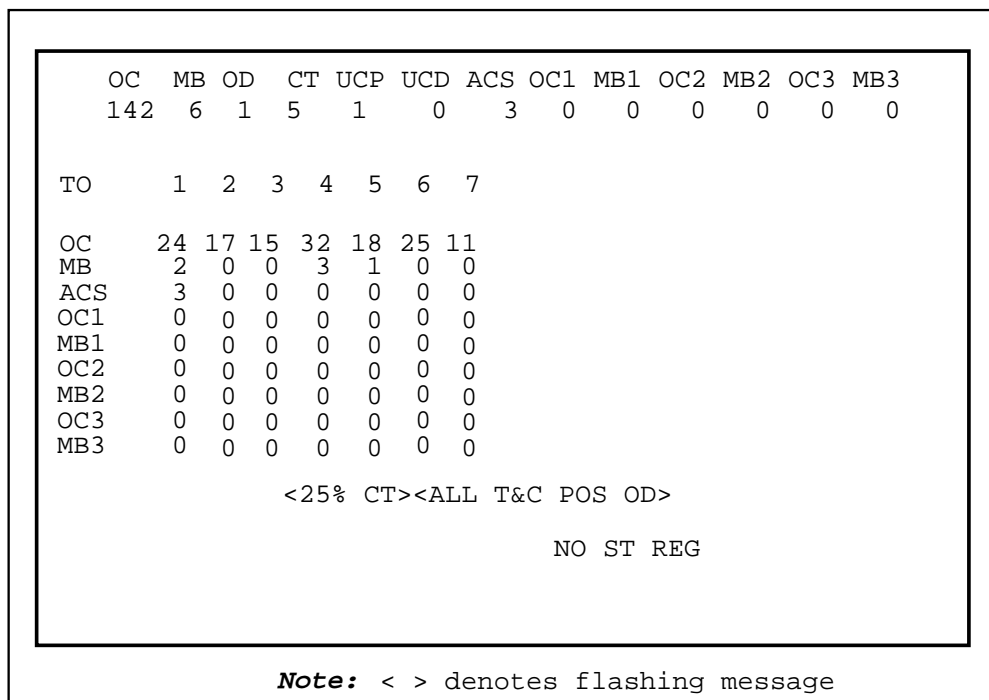
Note: If the OFCENG parameter TOPS_NUM_TRAFFIC_OFFICES is set to 16 or more, data is displayed on a TOPS 04 FMCRT for teams 1 through 15. Data for teams 16 or higher are not displayed. The TOPS MP FMCRT, however, can display data for all teams, up to the system maximum of 30.

The displays on the screens in Figures 6-1 through 6-4 are classified in FMCRT displays, on page 6-10.

TOPS MP force management crt

In a multitraffic office, the force manager may be provided with a TOPS MP FMCRT, to monitor the status of the offices and the quality of the service being provided. Figures 6-3 and 6-4 illustrate the display screen, with and without the call transfer feature activated.

The FM screen is divided into five general areas. Refer to Figures 6-3 and 6-4 while reading the following:

- The top area of the screen, known as the message/status area, displays messages broadcast from the FADS TTY.
- The lower part of the message/status area displays the status of the operator positions for the whole system.
- The area beneath the system display area displays the status of the operator positions in each traffic office.
- The area beneath the traffic office display area displays warning messages regarding various components in the system.
- The area at the bottom of the screen displays the softkey definitions. (This area is always used to display softkey definitions regardless of position type.)

Figure 6-3xxx
TOPS MP force management screen without call transfer active

Team Statistics

Office Statistics

OC	MB	OD	CT	UCP	UCD	ACS
0	0	0	0	0	0	0

Team	OC	MB	ACS
1	0	0	0
2	0	0	0
3	0	0	0
4	0	0	0
5	0	0	0
6	0	0	0
7	0	0	0
8	0	0	0
9	0	0	0
10	0	0	0
11	0	0	0
12	0	0	0
13	0	0	0
14	0	0	0
15	0	0	0
16	0	0	0

CD
CW

ALL T AND C POS OD   CAMA SUSPENDED

25% CT   NO ST REG   (delay)

| log Off | Adjust Pos | | | Stop Bell | | | |

System Status Display Window

Softkey Definition Window
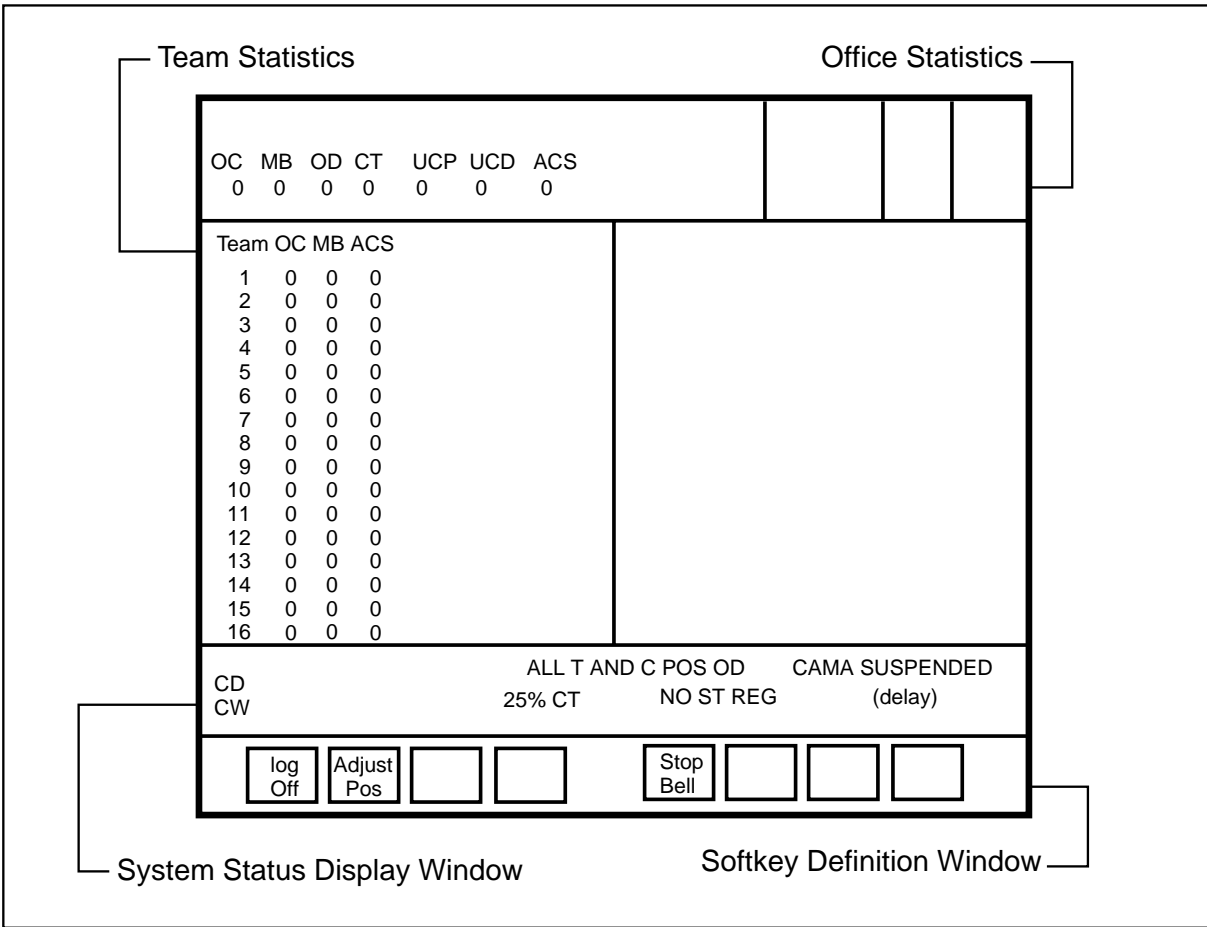
Figure 6-4xxx
TOPS MP force management screen, with call transfer active

Team Statistics

Office Statistics

OC	MB	OD	CT	UCP	UCD	ACS	OC1	MB1	OC2	MB2	OC3	MB3
0	0	0	0	0	0	0	0	0	0	0	0	0

Team	OC	MB	ACS	OC1	MB1	OC2	MB2	OC3	MB3
1	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0

CD CD1 CD2 CD3   ALL T AND C POS OD   CAMA SUSPENDED
CW CW1 CW2 CW3   25% CT   NO ST REG   (delay)

| log Off | Adjust Pos | | | Stop Bell | | | |

System Status Display Window

Softkey Definition Window

The displays on the FMCRT screens shown in Figures 6-3 and 6-4 are classified in the following paragraphs. Refer to Tables 6-1 through 6-4 for definitions of the displays.

FMCRT displays

The following paragraphs classify the displays that appear on the FMCRT screen. Refer to Tables 6-1 through 6-4 for definitions of these displays.

Position status displays for the system

The following displays are updated in ten-second scans with the number of positions in those states throughout the system: OC, MB, OD, CT, UCP, UCD, ACS, OC1, MB1, OC2, MB2, OC3, MB3.

> *Note:* During call processing, it can happen that all attached parties in a call go on-hook, yet remain attached to an unoccupied position. This might happen, for example, because the operator logged out before releasing the call or because the datapath was lost when the local area network went down.
>
> When this happens and the operator does not press a key on the position, a sanity timer goes into effect and takes the call down after a set period of time has expired. In order for the sanity timer to be used, the parameter POSITION_SANITY_TIMER must be set in Table TOPSPARM.
>
> When the sanity timer goes into effect, the UCP display appears on the FMCRT and the IC position screen. If the timer expires, the call is taken down and the UCP display disappears. The sanity timer can be reset by pressing any key, which indicates to the system that the operator has not abandoned the call. If either of the attached parties goes off-hook again, the sanity timer is cleared.

Position status displays for each traffic office

The following displays are updated in ten-second scans with the number of positions in those states in each traffic office: OC, MB, ACS, OC1, MB1, OC2, MB2, OC3, MB3.

Calls-waiting displays

When calls are waiting in queues for available operators, and the number of calls queued exceeds the CWON threshold in the QT table, the calls-waiting indicators display (CW, CW1, CW2, or CW3, depending on which queues are busy). These indicators are erased when the number of calls in the queues drops below the CWOFF threshold.

Calls-deflected displays

Calls may be deflected to an announcement or treatment for the following reasons:

- The sum of the number of calls of the same transfer type (non-XFR, XFR1, XFR2, and XFR DA) in the call and recall queues is equal to or greater than the relevant deflect threshold (Tables QT0 through QT5).
- An overflow occurs. Calls overflow when all CW queuing resources have been absorbed. That is, the number of calls enqueued exceeds the value set in Table OFCENG parameter TOPS_CALLS_WAITING_Q_SIZE.

Note: Calls deflect when all CW queuing resources have been absorbed. More specifically, the number of queued calls exceeds the value set in Table OFCENG parameter TOPS_CALLS_W AITING_Q_SIZE.

When the ratio of queued calls to occupied positions able to handle the calls reaches a defined threshold, the `CD` indicator for that queue displays on the screen. It is accompanied by an audible alarm that informs the office manager of customer-dialed calls being refused entry into the queue (that is, of calls being deflected). When the number of queued calls falls below the threshold, the `CD`, `CD1`, `CD2`, or `CD3` indicator is erased, and the audible alarm ceases.

Miscellaneous displays

Miscellaneous displays that appear on the FMCRT screen include the following : `<25% CT>`, `<ALL T&C POS OD>`, `<CAMA SUSPENDED>`, `<NO ASST POS>`, `<POS BUSY>`, and `NO ST REG`.

MPX IC position

The IC position serves a dual purpose: it monitors operator performance and displays the team status, in addition to assisting operators in handling calls. It can do one or the other but not both simultaneously.

The IC position screen displays the following force management information:

- current status of operator positions
- miscellaneous system information

In addition, the IC position is also capable of the following tasks:

- perform all general operator position functions except the following:
  - release a call to an interactive voice subsystem (IVS)
  - complete a call manually
  - perform searches other than administrative
  - bill
- accept assistance requests
- accept transferred calls for assistance
- monitor any operator in the SA/IC pool
  - monitor the voice connection with a three port conference connection
  - display the monitored operator screen at the monitoring operator position

- page an operator
- initiate an outgoing call
- perform administrative searches of the Northern Telecom Directory Assistance System (DAS)
- perform Stop Bell

    Note: There is no tracking of operator keystrokes and local position actions such as invoking a different window at the monitoring position, nor any reflection of UMP messages sent from the monitored position to the FT Gateway.

IC position screen

In a TOPS MPX environment, the IC position has two types of displays:

- ten-second scan force management statistics
- during monitoring, the same information found on the general operator and SA position screens

At the IC position, statistics display for up to four activated queues. Statistics on the IC, such as make busy and availability, are indicated in call control group 1. Since TOPS can support four queues and TOPS MPX has only one line on the screen to display statistics, headings are eliminated, and the queue statistics display in call control function area line 1. The x0123 display indicates whether calls are waiting or being deflected. Steady numbers indicate that the calls are waiting; flashing numbers indicate that calls are being deflected.

The TOPS MPX IC position screen is divided into two major areas, as illustrated in Figure 6-5. Twenty-three lines are used for DAS information services. The last line displays call control functions. These call control functions display at the upper right of the screen in four groups of sixteen characters.

Figure 6-5xxx
TOPS MPX IC screen

Call-control function area
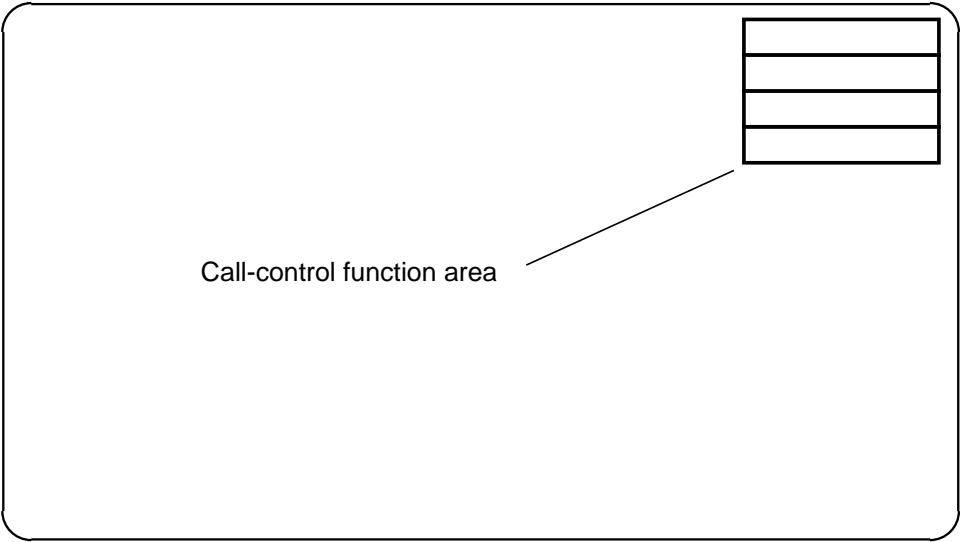
Table 6-5 defines the characters that appear in the first group of 16 call control characters. Figure 6-6 shows the location of these items on the display screen.

| Table 6-5 | | |
| **IC call control displays - first group** | | |
Display	**Column**	**Meaning**
B	0	Indicates that the IC position is in the busy state. If the position is idle, the status displays are still present.
D	0	Indicates that the IC position is accepting directed assistance requests only.
<A> (flashing)	1	Indicates that no SA positions are available.
M	2	Indicates that the IC position is monitoring a general operator; this item also displays when any other SA position is monitoring.
P	3	Indicates that a general operator is being paged.
OH	4-5	Signifies an operator-handled traffic condition. The voice response data links are down, and the operators are required to provide voice response on all queries. The Sonalert is sounded.
-continued-		

Table 6-5
IC call control displays - first group (continued)

Display	Column	Meaning
QYYYY	6-10	Indicates that a general assistance request is in queue; the Ys indicate the position of the operator making the request.
X0123	11-15	Signifies that calls are either waiting (steady) or being deflected (flashing), and is indicated by the number of the queue (0, 1, 2, or 3).
End		

Figure 6-6xxx
TOPS MPX IC screen - first group of characters
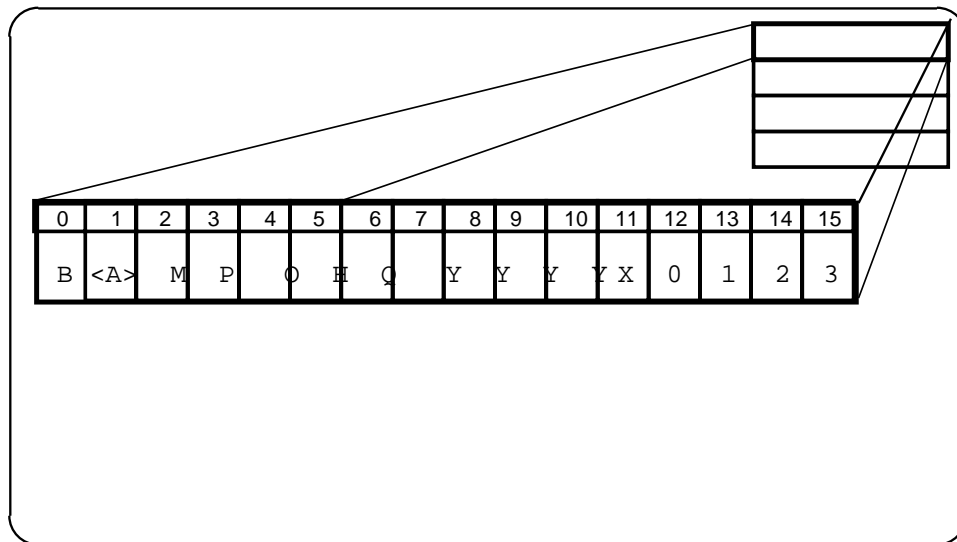
Table 6-6 defines the characters that appear in the second group of 16 call control characters.

Table 6-6
IC call control displays - second group

Display	Column	Meaning
XXX–XXX–XXXX	1-3	Indicates forward number entered by the IC manager. This number may be a one- or two-digit outgoing trunk (OGT) code, a seven-digit local number, or a ten-digit number. Flashing indicates an invalid forward number.
XX	4-5	Indicates that a two-digit OGT code was entered by the IC manager.
POS#XXXX	0-7	Indicates the position number of the general operator requesting assistance and displays in this location for a general request arriving on loop 1. If flashing, loop 1 is on hold.
POS#XXXX	8-15	Indicates the position number of the general operator, the service assistant, or the IC manager requesting assistance and displays in this location for a directed request arriving on loop 2. If flashing, loop 2 is on hold.
IMA	8-10	Indicates that the position is an IC position (I), with service assistant (A), and monitoring capabilities (M).
CLD	13-15	Specifies called supervision.
REL BY OPR#XXXX	0-15	Indicates an assistance request was generated by an operator and released to wait in queue.

Figure 6-7 shows the location of these items on the display screen.

Figure 6-7xxx
TOPS MPX IC screen - second group of characters
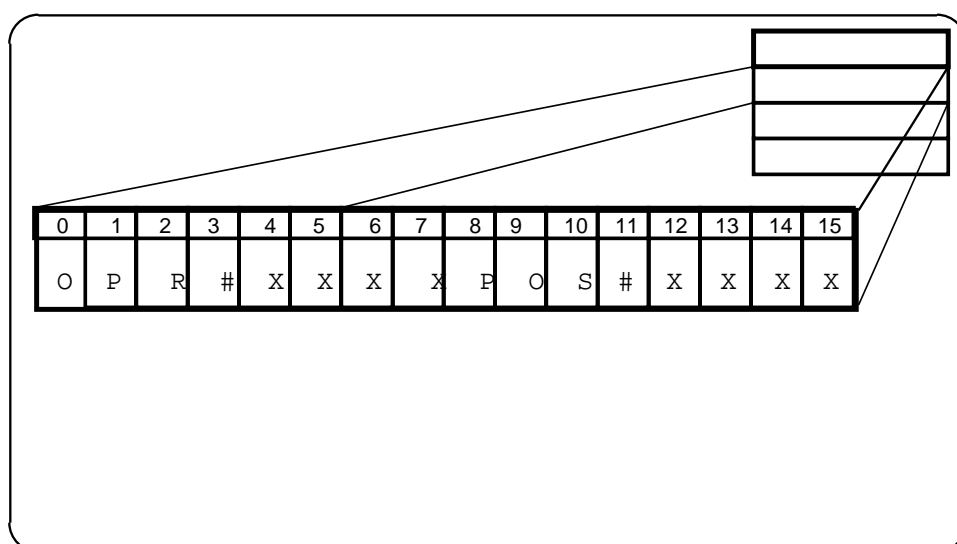
Table 6-7 defines the characters that appear in the third group of 16 call control characters.

Table 6-7
IC call control displays - third group

Display	Column	Meaning
YYY	0-2	Indicates the total number of general operator positions in the IC team currently occupied. If no positions are occupied, a zero flashes.
OPR#XXXX	0-7	Indicates the operator number is being paged when displayed with P on line 0, column 3.
YYY	3-5	Indicates the number of positions in this IC team serving the XFR1 queue and currently occupied. If there are none, a zero flashes.
YYY	6-8	Indicates the number of positions in this IC team serving the XFR2 queue and currently occupied. If there are none, a zero flashes.
YYY	9-11	Indicates the number of positions in this IC team serving the XFR DA queue and currently occupied. If there are none, a zero flashes.
UP	12-13	Signifies that an unsupervised call is in progress at a position that is not logged on.
UD	14-15	Signifies that an unsupervised call has been disconnected.

Figure 6-8 shows the location of these items on the display screen.

Figure 6-8xxx
TOPS MPX IC screen - third group of characters

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	U	P	U	D
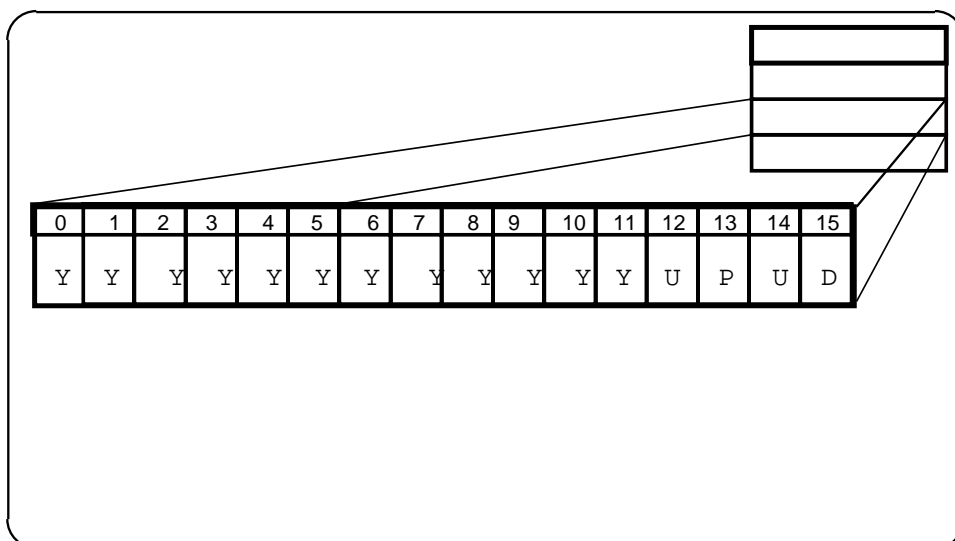
Table 6-8 defines the characters that appear in the fourth group of 16 call control characters.

Table 6-8
IC call control displays - fourth group

Display	Column	Meaning
ZZZ	0-2	Indicates the total number of general operator positions in the IC team currently in a made-busy state. If no positions are made busy, a zero displays.
ZZZ	3-5	Indicates the number of positions in this IC team serving the XFR1 queue and currently made busy. If there are none, a zero displays.
ZZZ	6-8	Indicates the number of positions in this IC team serving the XFR2 queue and currently made busy. If there are none, a zero displays.
ZZZ	9-11	Indicates the number of positions in this IC team serving the XFR DA queue and made busy. If there are none, a zero displays.
A1	12-13	Indicates that loop 1 has been accessed.
A2	12-13	Indicates that loop 2 has been accessed.
H1	14-15	Indicates that loop 1 is on hold.
H2	14-15	Indicates that loop 2 is on hold.

Figure 6-9 shows the location of these items on the display screen.

Figure 6-9xxx
TOPS MPX IC screen - fourth group of characters

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	A	1	H	2
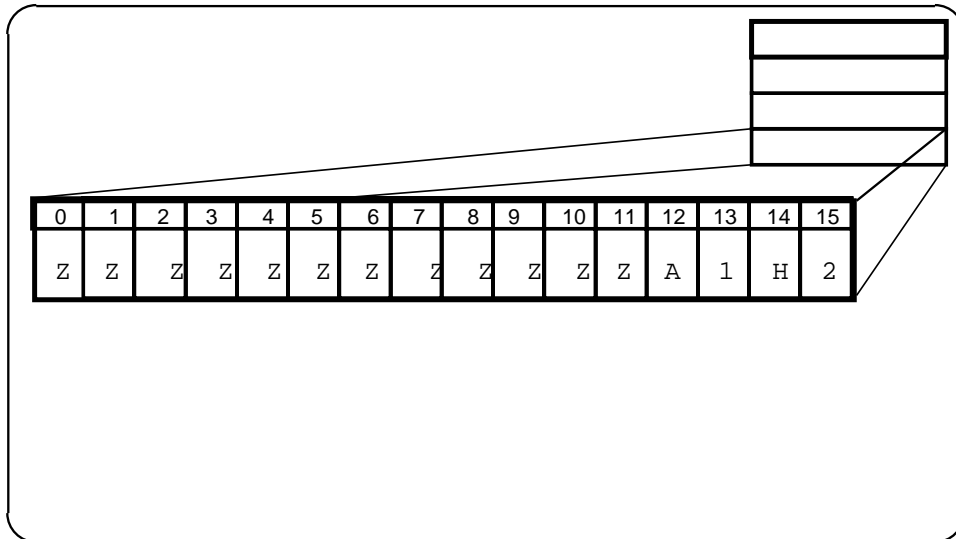
IC ten-second scan displays

The TOPS MPX IC screen display also provides a ten-second scan display for positions occupied and for positions made busy.

Positions occupied ten-second display

When the ten-second scan for occupied positions displays, the data are presented in character positions 0-11 of group 3.

Positions made busy ten-second display

When the ten-second scan for positions made busy displays, the data are presented in character positions 0-11 in group 4.

TOPS MPX IC position keyboard

There are two functional variations of the keyboard: one for IC and SA positions and another for general operator positions. The main keyboard cluster is the same for both. The key functions currently available for the call-processing cluster are shown in Table 6-9.

Table 6-9xxx
TOPS MPX call-processing cluster key descriptions

Key	Description
Make Busy	Toggles the position busy or ready
Opr	Used with the digit keys and the **Start** key to log on, to request assistance, and to page and monitor
Stop Bell	Pressed to stop the Sonalert from sounding.
ACS	Accesses loop 1 or loop 2 when used with digits and **Start**
Hold	Holds the connection on the active loop
Clg	Pressed with number keys and the **Start** key to enter the calling number for calls that arrive ONI or ANIF.
Rls Cld	Releases the forward party
Ca Call	Pressed to cancel the call

The location of these keys is shown in Figure 6-10.

Figure 6-10xxx
TOPS MPX keyboard call processing cluster - IC and SA positions

Note: Shaded keys indicate functions not available in the current release of TOPS MPX NT DA.
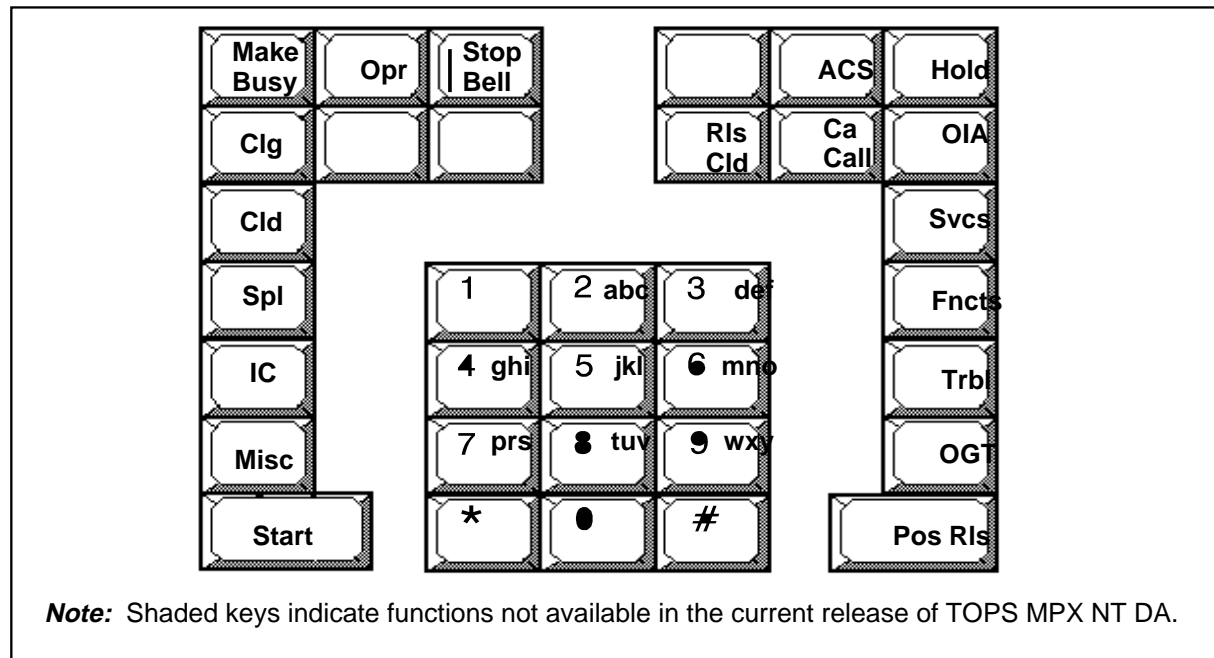
Position status checks

Position status checks are useful to the IC manager in meeting efficiency and speed-of-answer objectives and in analyzing periods when these goals are not met consistently.

The current status of operator positions displays continuously in the menu window of the IC position screen, except when overwritten by menu information.

The IC screen displays statistics concerning the number of occupied and made-busy general operator positions in the IC team. Group 3 of the IC screen shows the statistics on occupied positions, and has four numbers. The first number is a count of all general positions in the IC team that are in an occupied state. The second, third, and fourth numbers are counts of general operators in the occupied state that can serve the XFR1, XFR2, and XFR DA queues respectively.

Group 4 of the IC screen displays the made-busy statistics and has four numbers. The first number is a count of all general operator positions in the IC team that are in the made-busy state. This count is independent of which queue each general operator serves. The second, third, and fourth numbers are counts of general operators in the made-busy state that can serve the XFR1, XFR2, and XFR DA queues respectively.

SA position

SA positions are provided in the traffic office and consist of a specially configured TOPS MPX keyboard and an AOSS window as described for the IC position.

The service assistant performs the following functions at the SA position:

- perform all general operator position functions except the following:
  - release a call to an IVS
  - complete a call manually
  - perform searches other than administrative
  - billing
- receive assistance requests from operators
- monitor operators
  - monitor the voice connection with a three port conference connection
  - display the monitored operator screen at the monitoring operator position
- page operators or positions
- accept transferred calls for assistance
- perform Stop Bell
- perform administrative searches

TOPS MPX SA position screen and keyboard

The TOPS MPX SA position uses the same type of screen and keyboard as the IC position. The major difference is in the data that appears in the four 16-character fields at the bottom right of the screen.

Table 6-10 defines the characters that appear in the first group of 16 call control characters.

Table 6-10
SA call control displays - first group

Display	Column	Meaning
B	0	Indicates that the position is busy, not accepting calls.
<A> (flashing)	1	Indicates that no SA positions are available.
M	2	Indicates that the position is monitoring a general operator.
P	3	Indicates that the position is paging a general operator.
CW	11-12	Indicates that the number of calls waiting to be handled is greater than the threshold value.
CD	14-15	Indicates that the number of calls waiting has reached a threshold at which calls have begun to deflect.

Figure 6-11 shows the location of these items on the display screen.

Figure 6-11xxx
TOPS MPX SA screen - first group of characters
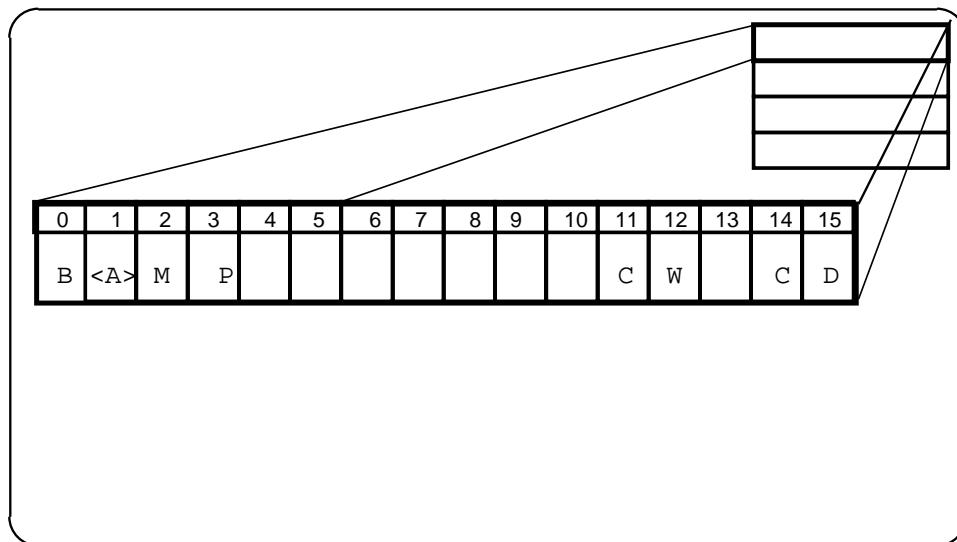
Table 6-11 defines the characters that appear in the second group of 16 call control characters.

Table 6-11
SA call control displays - second group

Display	Column	Meaning
CLD#XXX- XXX-XXXX	0-15	Indicates the forward number entered by the SA. This number may be a one- or two-digit OGT code, a seven-digit local number, or a ten-digit number. If flashing, an invalid forward number has been entered.
CLD# XX	0-9	Indicates that a two-digit OGT code has been entered by the service assistant.
OPR#XXXX	0-7	Indicates the operator number of the general operator, the service assistant, or the IC manager requesting assistance on loop 2; columns 8-15 are for requests on loop 1.
POS#XXXX	0-7	Indicates the position number of the general operator requesting assistance on loop 1; if flashing, loop 1 is on hold.
POS#XXXX	8-15	Indicates the position number of the general operator, the service assistant, or the IC manager requesting assistance on loop 2; if flashing, the loop is on hold.
MA	9-10	Indicates that the service assistant has monitoring abilities.
REL BY OPR#XXXX	0-15	Indicates an assistance request was generated by an operator and released to wait in queue.

Figure 6-12 shows the location of these items on the display screen.

Figure 6-12xxx
TOPS MPX SA screen - second group of characters
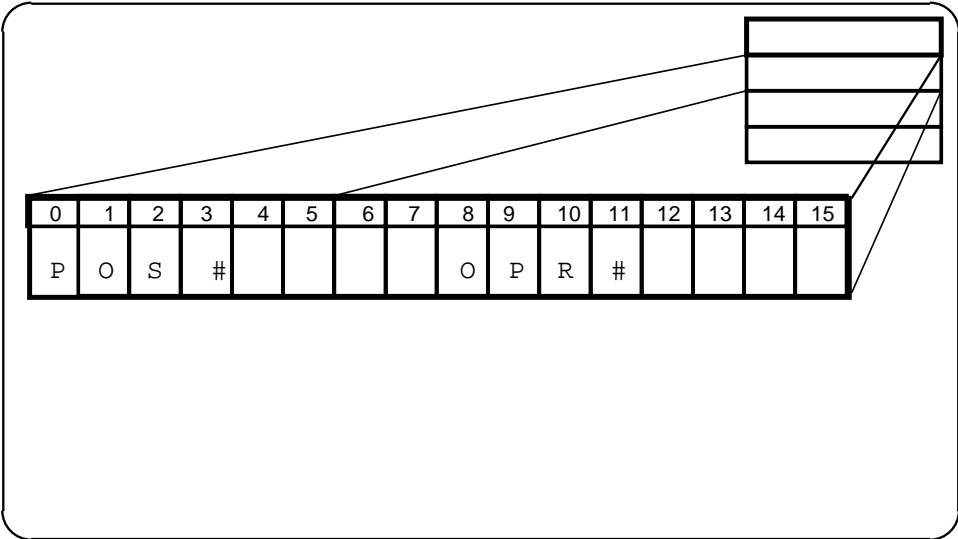
The third group of 16 characters contains only one item: CLD - called supervision. CLD displays when the forward (called) party is on-hook (phone ringing), off-hook (busy signal), or on-hook after the operator announcement was made.

Figure 6-13 shows the location of this item on the display screen.

Figure 6-13xxx
TOPS MPX SA screen - third group of characters
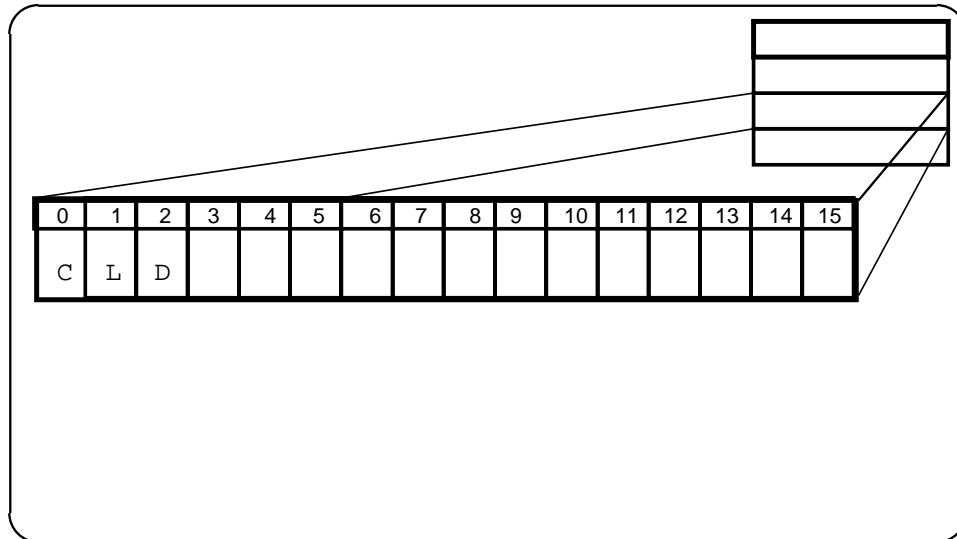
Table 6-12 defines the characters that appear in the fourth group of 16 call control characters.

Table 6-12
SA call control displays - fourth group

Display	Column	Meaning
A1	12-13	Indicates that loop 1 has been accessed.
H1	12-13	Indicates that loop 1 is on hold.
A2	14-15	Indicates that loop 2 has been accessed.
H2	14-15	Indicates that loop 2 is on hold.

Figure 6-14 shows the location of these items on the display screen.

Figure 6-14xxx
TOPS MPX SA screen - fourth group of characters
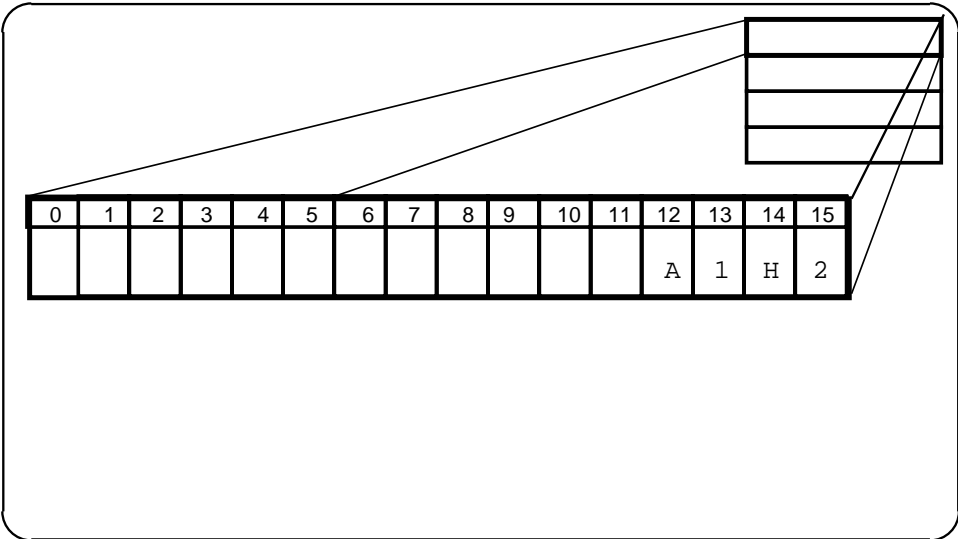
Logging on and off

The logon procedure for the service assistant and the IC manager is similar to the logon procedure for general operators. The logon screens are the same as those of the general operators.

TOPS MPX logon procedure

Service assistants and the IC manager use the logon procedure described in Procedure 6-1.

Procedure 6-1xxx
Logging on to an SA or IC position

Step	Action	Response
1	At the IC or SA position, adjust the terminal for comfort.	If the switch connection is not complete, the following message is displayed: `Link problems encountered...`
2	If the message `Link problems encountered..` is displayed, report the condition to a supervisor and follow local practices concerning remaining at the position or moving to an operable position. Otherwise, go to Step 3.	
3	Insert the headset.	The following message is displayed: `Please log on...`
4	Press the space bar.	If the headset is not properly seated, `Please log on...` is displayed. Return to Step 3 if the previous message is displayed. If the headset is seated properly, the ID and Password fields are displayed.
5	Enter an ID number using the number keys above the alphabet keys or the number keypad located in the Call Processing area of the keyboard. A password entry is not required at this time.	
6	Press the **Start** key.	

-continued-

Procedure 6-1xxx
Logging on to an SA or IC position (continued)

Step	Action	Response
7	Either conduct administrative searches or press the **Make Busy** key to accept assistance requests at the SA position or to accept directed requests at the IC position.	The screen clears and the search screen is displayed. The position is now ready to answer calls from customers and conduct searches.
8	Press the **Make Busy** key twice at the IC position to accept general assistance requests.	
	End	

Note: Press the **Make Busy** key once to make the IC position available only to directed assistance requests. Press the **Make Busy** key twice to make the IC position available to general assistance requests. Service assistants press the **Make Busy** key only once to be either available or not available.

For a TOPS MPX position service set, the central control (CC) initiates DAS logon. The CC sends a message to the TOPS position controller (TPC) instructing it to log on to a specific DAS based upon the position service set. If the DAS logon is successful, the service set for the position is sent to the TPC. If the DAS logon is unsuccessful, the SA position still receives DAS assistance calls from a general operator. A log is provided at the MAP, indicating the failure to log on to the DAS.

TOPS MPX logoff procedure

The logoff procedure for service assistants and the IC manager is described in Procedure 6-2.

Procedure 6-2xxx
Logging off of an SA or IC position

Step	Action	Response
1	When ready to log off, press the **Make Busy** key.	
2	When the active call is completed, unseat the headset.	The position is returned to the **{Position ready for sign on}** screen.

Note: If the service assistant is monitoring another call or is not currently processing any calls, logoff occurs as soon as the headset is disconnected. The monitoring display is cleared from the screen.

Handling assistance requests

When an operator is unable to handle a call, a service assistant or the IC manager can provide assistance by answering operator questions or by talking to the customer directly.

There are two types of operator requests for assistance:

- directed requests
- general requests

In a directed request, a general operator asks a specific service assistant or the IC manager for help. (Service assistants and the IC manager can also make directed requests.) In a general request, an operator asks for help from any service assistant or IC manager available. (Service assistants and IC managers cannot make general requests.)

Responding to directed requests

A Sonalert is generated at the position receiving a direct request. Procedure 6-3 describes how the service assistant or IC manager responds to a directed assistance request.

	Procedure 6-3xxx **Responding to a directed assistance request**	
Step	**Action**	**Response**
1	At the IC or SA position, press the **ACS** key.	
2	Press **2**.	The call on loop 2 is accessed.
3	Answer operator questions.	
4	Press the **Pos Rls** key.	The request is released.

Note: To respond to an assistance request, the service assistant or IC manager must share service types with the requesting operator.

Responding to general requests

Operators may also request help from any available supervisory position. A Sonalert is generated at the position receiving the request. Procedure 6-4 describes how the service assistant or IC manager responds to a general request.

Procedure 6-4xxx **Responding to a general assistance request**		
Step	**Action**	**Response**
1	At the IC or SA position, press the **ACS** key.	
2	Press **1**.	The call on loop 1 is accessed.
3	Answer operator questions.	
4	Press the **Pos Rls** key.	The request is released.

Note: The IC manager can toggle among three states: busy mode, direct mode, and general mode.

Monitoring and paging operators

Both SA and IC positions can monitor and page operators. The keys, procedures, and screen displays involved are the same for both types of positions. Neither IC positions nor SA positions can be monitored.

Monitoring an operator position

Monitoring operator calls to determine efficiency is part of managing the work force. Service assistants and IC managers can monitor individual operator progress. Normally, the SA position is used to monitor operators, because the IC position constantly displays the position status for the traffic office. To monitor an operator, follow the steps in Procedure 6-5.

Procedure 6-5xxx
Monitoring an operator position from the IC or SA position

Step	Action	Response
1	Ensure that the position is in make-busy mode.	
2	Press the **Opr** key.	
3	Press 5 (for position) or 6 (for operator).	
4	Type in the number of the operator or position to be monitored (for example, 113).	
5	Press **Start**.	The screen clears, and all call information on the operator position screen also appears on the IC or SA position screen. The service assistant or IC manager can hear the conversation between the operator and the customer. M appears on the screen to indicate a monitoring session.

Procedure 6-6 describes how to end a monitoring session.

Procedure 6-6xxx **Ending a monitoring session**		
Step	**Action**	**Response**
1	Press the **Opr** key.	
2	Press 5 (for position monitoring) or 6 (for operator monitoring).	
3	Press **Start**.	The monitoring session is ended.

Note 1: The monitoring process does not stop if the operator logs out. The only way to drop the monitor connection is for the service assistant or the in-charge manager to stop monitoring the operator.

Note 2: Any Sonalert condition takes the in-charge or assistance position out of monitoring mode and returns the original screen with an appropriate message displaying the condition that caused the Sonalert to sound.

An SA position can monitor an operator with DA capability as long as the assistance service set includes DA. When an SA position with DA capability monitors a TOPS MPX operator position with DA capability, the DA service screen is shown on the SA position screen.

The SA position screen is updated to reflect any changes on the TOPS MPX operator position screen as long as the changes on the TOPS MPX operator position screen are requested by the DMS central control (CC). Any local screen changes performed by the operator will not be reflected on the SA position screen. For example, if a DA call is presented to the operator in the DA screen, the DA screen also displays at the SA position screen.

Paging an operator position

All TOPS MPX administrative positions have the ability to page a specific operator and request that the operator call back.

The operator position to be paged can be specified by position number or by operator number. The position number represents the location of the operator position in the traffic office floor plan. The operator number represents the identity of the particular operator being paged, regardless of floor plan location.

Procedure 6-7 describes how to page an operator from the IC or SA position.

Procedure 6-7xxx **Paging an operator from the IC or SA position**		
Step	**Action**	**Response**
1	Press the **Opr** key.	
2	Press 3 (for position) or 4 (for operator).	
3	Type in the position or operator number (for example, 113).	
4	Press **Start**.	POS xxxx or OPR xxxx display on the position screen.

When an IC or SA position pages an operator position, the request flashes on the operator position screen, and the operator answers by making a directed set call to the paging position. A directed set call is a call made to a specific supervisory position.

Note: If the service assistance position is in make-busy mode, the operator cannot call the position to answer the page.

The operator position cannot page but can only respond to pages.

Procedure 6-8 describes how to cancel a page.

Procedure 6-8xxx **Cancelling a page**		
Step	**Action**	**Response**
1	Press the **Opr** key.	
2	Press 3 (for position page) or 4 (for operator page).	
3	Press **Start**.	The page is cancelled.

Performing administrative searches

Administrative searches are performed in the same way at the SA position and the IC position. Procedure 6-9 describes how to perform an administrative search.

Procedure 6-9xxx **Performing an administrative search**		
Step	**Action**	**Response**
1	Enter the appropriate search details.	
2	Press the appropriate database key (such as **Bus**, or **Gov**).	The search is triggered.
3	Quote the listing (if appropriate).	
4	Press the **Pos Rls** key.	The call is released and search details are cleared from the screen.

Responding to the local Sonalert (stop bell)

The Sonalert is an audible signal generated at the SA or IC position, or both. Table 6-13 lists conditions that cause the Sonalert tone to sound and indicates the positions at which it sounds.

Table 6-13xxx Conditions under which the Sonalert is generated		
Condition	**Position**	**Screen display**
Assistance request arrival	IC or SA position at which the assistance request has arrived	`POS XXX` (in upper left corner or upper right corner of screen)
Call in queue - no position occupied	IC, SA, and FMCRT	`CW`
Transfer call in queue - no transfer position occupied	IC, SA, and FMCRT	`CW1`, `CW2`, or `CW3`
Assistance request queued	IC	`POS XXX` (below the status message)
Calls-deflected	IC, SA, and FMCRT	`CD`
Transfer calls-deflected	IC, SA, and FMCRT	`CD1`, `CD2`, or `CD3`, depending on the transfer queue affected
25% controlled traffic	FMCRT	`25% CT`
SA or IC position is connected to the call and the general operator is attached	SA or IC	`POS#XXXX  OPR#XXXX`
SA or IC position is connected to the call and the general operator is no longer attached	SA or IC	`REL BY OPR#XXXX`

To silence the Sonalert at the IC position, press the **Stop Bell** key on the IC or SA position keyboard where the Sonalert is being generated.

To silence the Sonalert tone generated at the FM position, enter **S** at the FADS TTY. Refer to Chapter 8, "TTY commands, queries, and reports," for details. If the bell was caused by a calls-deflected condition, it ceases automatically when the queue length drops below the calls-deflected threshold. The tone returns when the threshold is passed again.

Handling assistance request queues

When operators place a general assistance request to a service assistant or an IC manager and no SA or IC positions are available to answer them, these requests are queued. Enhanced SA and IC queueing allows up to 16 operator requests to be queued for assistance.

Table SAQSIZE

Table SAQSIZE allows operating companies to datafill the depth of the queue for assistance requests. The maximum allowable depth is 16. This table also allows the company to determine when the Sonalert should be activated. When the number of SA/IC requests in queue exceeds the value, the Sonalert is activated. When the number of queued requests falls below this value, the Sonalert is deactivated.

> *Note:* If a team is not datafilled in this table, its queue size defaults to one. The Sonalert for that team is activated whenever assistance requests are in queue.

Table OFCVAR

An office parameter available in Table OFCVAR controls whether an operator in one team can receive assistance from a service assistant or IC manager in another team. The parameter TOPS_CROSS_TEAM_ROUTING applies to both general and directed requests. When this office parameter is set to yes (Y) and a general operator requests assistance, the DMS first searches the operator group for an available service assistant or IC manager. If none is available, the DMS searches the other teams for an available service assistant or IC manager.

When TOPS_CROSS_TEAM_ROUTING is set to Y:

- A general operator can enter **OPR** + 0 + **Start** and be connected with the first available service assistant or in-charge manager. The search starts with the general operator team. Service assistants are checked first, then the in-charge manager. If no one is available, the search proceeds to the next team. This process is repeated until an available service assistant or in-charge manager is found. If none is found, the request is queued, and the queueing indication appears on the original team IC position.

- A general operator can key **OPR** + 0 + digits + **Start** to be connected to a particular service assistant or in-charge manager in any team. If the service assistant or in-charge manager is not available, the general operator hears a busy tone. There is no queueing. The general operator must release the call and try again.

- A service assistant or in-charge operator can key **OPR** + 0 + digits + **Start** to be connected to a particular service assistant or in-charge manager in any team. The same indications apply for service assistants and in-charge managers.

When TOPS_CROSS_TEAM_ROUTING is set to N:

- A general operator can key **OPR** + 0 + **Start** and be connected with the first available service assistant or in-charge manager. The search starts with the general operator team. Service assistants are checked first, then the in-charge manager. If no available service assistant or in-charge manager is found, the request is queued. The queueing indication appears on the IC position of the general operator team. Service assistants and in-charge managers becoming available in other teams do not get the queued request. It can be serviced only by a service assistant or in-charge manager from the same team. The general operator cannot connect to a service assistant or in-charge manager in another team.

- A general operator can key **OPR** + 0 + digits + **Start** to be connected to a particular service assistant or the in-charge manager in that operator team. The operator cannot connect to a service assistant or in-charge manager in another team.

- A service assistant or in-charge manager can key **OPR** + 0 + digits + **Start** to be connected to a particular service assistant or in-charge manager in any team. Service assistants and in-charge managers are not affected by the TOPS_CROSS_TEAM_ROUTING parameter.

  Note 1: The TOPS_CROSS_TEAM_ROUTING parameter also controls whether an SA or IC position can page a general operator in another team.

  Note 2: General operators cannot request assistance from service assistants or in-charge managers in other switches without dialing an outside number.

Table TOPSPARM

A parameter in Table TOPSPARM allows the operating company to queue assistance requests strictly by the age of the request. The parameter SA_QUEUEING_BY_REQUEST_AGE applies to general requests. When this office parameter is set to yes (Y), the DMS searches each team request queue. It connects the oldest request in the entire switch to the next available SA or IC position that has compatible service types.

Table TOPSPOS

The maximum number of SA/IC positions that can be datafilled in Table TOPSPOS is 126. These 126 positions may be divided among teams, or up to 126 SA/IC positions may be datafilled for a single team. (Only one of these can be an IC position.) If a team is datafilled with 126 SA/IC positions, then no other SA and IC positions may be datafilled in any other teams.

Releasing calls to queue

When the general operator requests assistance and is queued, the service assistant or IC manager does not answer immediately. The on-hook forward supervision display CLD appears on the operator screen to indicate that the request is in queue. If the general operator is no longer needed, the operator

can press **Pos Rls** to release the call into queue. The operator should inform the calling party that the subscriber is in queue by saying, "Please hold for assistance." At this time, the general operator is released from the call and is free to handle the next call.

When the SA or IC position is connected to the call, the position receives a message. If the general operator is no longer attached, the message reads:

```
REL BY OPR#XXXX
```

If the operator is still attached, the message reads:

```
POS#XXXX   OPR#XXXX
```

The IC displays also show how many calls are in queue and whether the queue is full. When SA/IC requests are in queue, a display appears on the IC screen, indicating that requests are queued. The IC manager can become available to assist or can note that more service assistants are required during that particular time of day. When operators are queued, the display `ACW nn` shows (with nn representing the number of operators in queue). When the queue is full, the display `<ACW nn>` shows in a flashing mode.

Handling out-of-service positions

When moving an SA position or the IC position from one power outlet jack to another, first remove the position from service. At the TTY, enter **O**, followed by the floor plan number of the SA or IC position.

Note: When all SA positions have been removed from service, <A> displays on the IC position screen.

To place an SA or IC position back in service, enter **I** and the floor plan number of the position at the TTY.

To query the status of the SA or IC positions, enter **O**. For further details on the TTY commands, refer to Chapter 8, "TTY commands, queries, and reports."

Restoring communication with the DMS

The following events show that an SA or IC position has lost contact with the DMS:

- There is no response to keystrokes.
- A call arrival tone sounds but there is no screen update
- The position contact message disappears.

If any of these situations happen, pressing the **Start** key refreshes the screen and reestablishes the call.

Effects of QMS on TOPS MPX SA and IC screens

Although the queueing of calls to SA and IC positions is not affected by QMS, the displays at SA and IC positions differ when QMS is used instead of ACD. SA and IC positions associated with QMS teams of operators have a call waiting (CW) and a call deflect (CD) indicator at the position. These indicators are updated on a ten-second basis. They indicate that a TOPS QMS queue is in a CW or CD state. A force management command is provided at QMS force management TTYs to query which queue is in the CW or CD state. (A TOPS QMS queue is in CW or CD state based on datafill in Tables TQCQINFO and QMSCQDEF.)

IC positions associated with QMS teams display total real-time statistics for the positions in their respective teams. The statistics displayed include, for example, the number of positions on the team in made-busy state, the number occupied, and the number out of order.

SA and IC displays associated with TOPS ACD teams remain unchanged.

The CW and CD displays on SA and IC positions associated with QMS teams have the same screen location as on SA and IC positions associated with TOPS ACD teams. The location of the displays is shown in Figures 6-15 and 6-16. On SA and IC positions associated with QMS teams, the CW and CD statuses are not displayed for each queue.

Note: The QCQ display is not supported on TOPS MPX SA and IC screens. It does appear, however, on the FMCRT screen.

Figure 6-15
TOPS MPX SA position screen with QMS
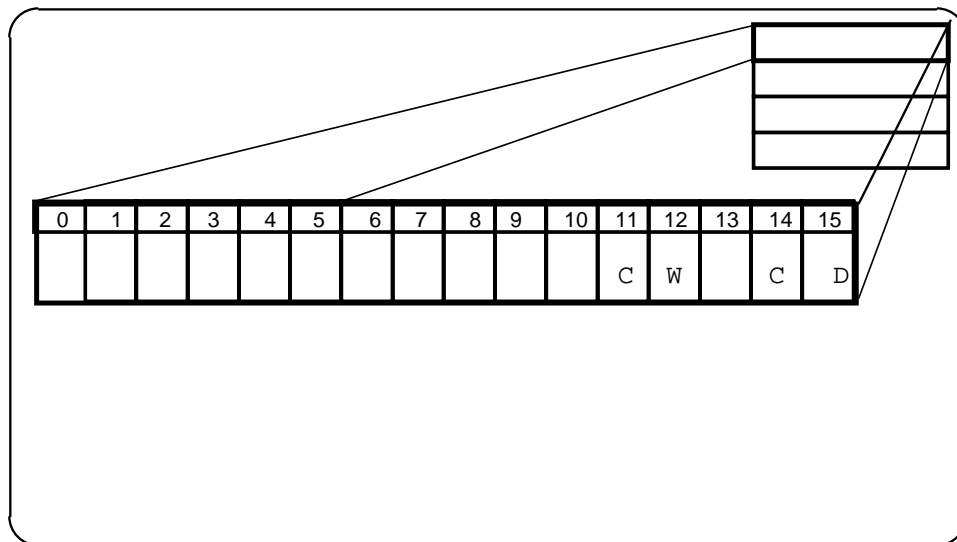
The team statistic displays on IC positions associated with QMS teams have the same screen locations as on IC positions associated with TOPS ACD. The location of the displays is shown in Figure 6-16. IC positions associated with QMS teams do not display statistics for each queue.

Figure 6-16xxx
TOPS MPX IC position screen with QMS

In the third row of Figure 6-16, the sample number 24 indicates the total number of general operator positions in the IC team currently occupied. The characters UP indicate that an unsupervised call is in progress at a position that is not logged on, and the characters UD indicate that an unsupervised call has been disconnected. The sample number 3 in the fourth row indicates the total number of general operator positions in the IC team currently in a made-busy state.

Effects of QMS on the TOPS 04 and TOPS MP FMCRT screens

Slightly different screen displays may apply to FMCRT positions, depending on whether the configuration is purely QMS or a mixed configuration containing TOPS ACD and QMS positions. For purely QMS configurations, the office statistics do not contain data about each individual queue. The per team statistics also contain no individual queue data. Only team totals are displayed. Similarly, only system QCW, QCD, and QCQ displays are present on an FMCRT in a purely QMS configuration. Figure 6-17 shows the TOPS MP 04 FMCRT screen with QMS displays for a purely QMS configuration. Figure 6-18 shows the TOPS MP FMCRT screen with QMS displays for a purely QMS configuration.

Note: Entering the CW, CD, and CQ commands from the QTADS TTY causes the TTY to identify specific queues that have calls waiting or deflecting, or that have calls but have no operator assigned. These commands are explained in Chapter 9, "QMS TTY commands, queries, and reports."

Figure 6-17
TOPS 04 FMCRT screen with QMS displays for a purely QMS configuration

```
         OC   MB   OD   CT   UCP   UCD   ACS
          0    3    0    2    0     0     1

    TO     1    2    3    4    5    6    7
    OC          3    4    1    0    0    0    0
    MB          1    2    0    0    0    0    0
    ACS         1    0    0    0    0    0    0




                <25% CT><ALL T&C POS OD>


    QCW  QCD   QCQ      25% QCT
                                NO QST REG    25% QCT


```

Note: < > denotes flashing message

Figure 6-18xxx
TOPS MP FMCRT screen with QMS displays for a purely QMS configuration
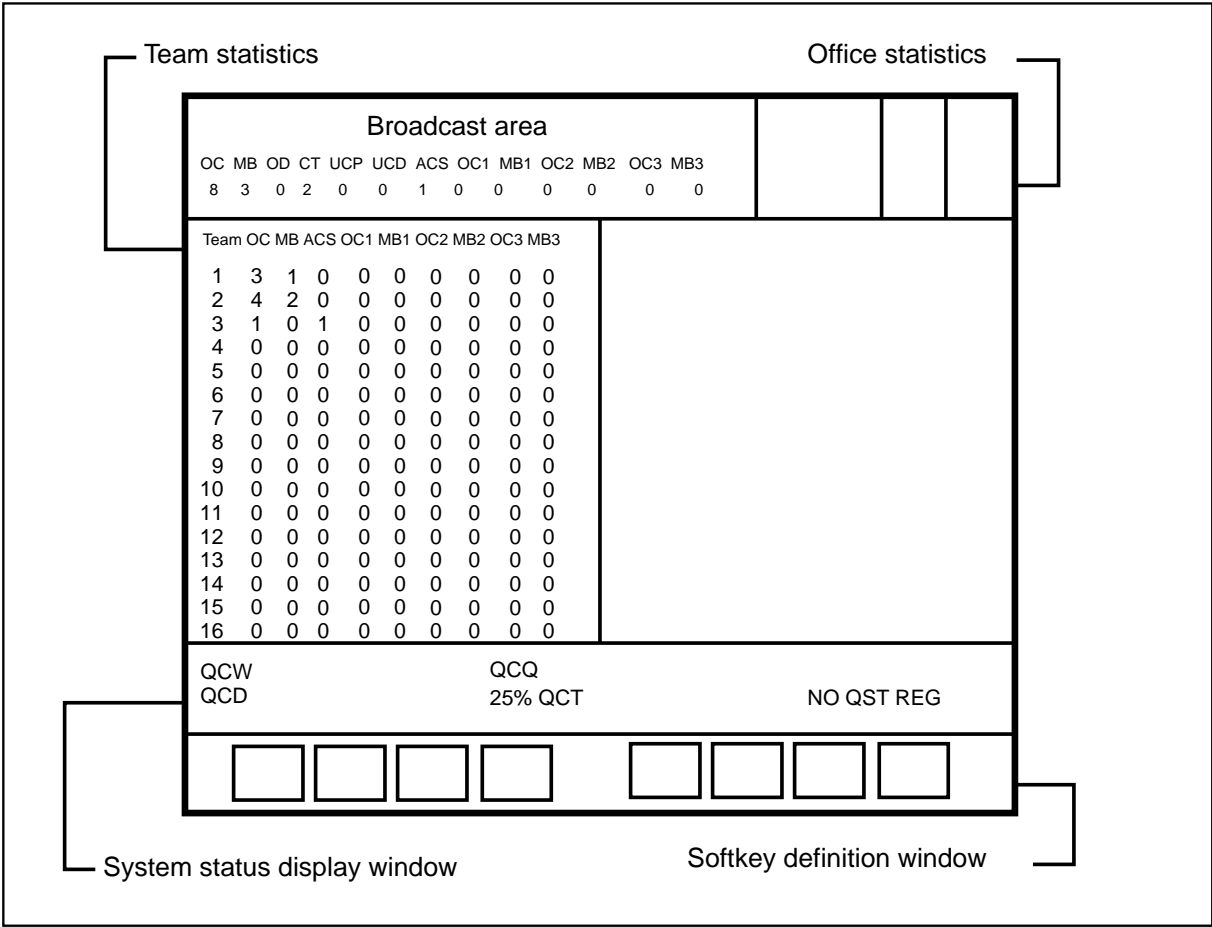
In mixed configurations containing TOPS ACD teams and QMS teams, per queue data (OC1, MB1, OC2, and so forth) is displayed in the office statistics area only for TOPS ACD teams. The office totals (OC, MB, OD, and so forth) pertain to both TOPS ACD teams and QMS teams. Also in mixed configurations, the team statistics contain per queue data (OC1, MB1, OC2, and so forth) only for TOPS ACD. Figure 6-19 shows the TOPS MP FMCRT screen with QMS displays for a mixed QMS and ACD configuration.

Figure 6-19xxx
TOPS 04 FMCRT screen with QMS displays for a mixed QMS and ACD
configuration

```
     OC   MB OD   CT UCP UCD ACS OC1 MB1 OC2 MB2
      0    3   0   2   0    0   1   0   0   0   0

TO      2   2   3   4   5    6   7

OC      1   4   1   0   0    0   0

MB      2   2   0   0   0    0   0

ACS     1   0   0   0   0    0   0

OC1     0   0   0   0   0    0   0

MB1     0   0   0   0   0    0   0

OC2     0   0   0   0   0    0   0

MB2     0   0   0   0   0    0   0

QCW   QCD   QCQ    25% CT

CWCW1CW2CW3    CDCD1CD2CD3 NO ST REG NO QST REG   25% QCT
```

Figure 6-20
TOPS MP FMCRT screen with QMS displays for a mixed QMS and ACD configuration

Team statistics

Office statistics

Broadcast area

OC	MB	OD	CT	UCP	UCD	ACS	OC1	MB1	OC2	MB2	OC3	MB3
5	3	0	2	0	0	1	0	0	0	0	0	0

Team	OC	MB	ACS	OC1	MB1	OC2	MB2	OC3	MB3
1	2	0	0	2	0	0	0	0	0
2	1	3	0	0	1	1	2	0	0
3	2	0	0	0	0	1	0	1	0
4	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0

QCW	CW	CW1	CW2	CW3	QCQ			
QCD	CD	CD1	CD2	CD3	25% CT	25% QCT	NO ST REG	NO QST REG

System status display window

Softkey definition window

Mechanized force administration data system

This chapter explains how the mechanized force administration data system (MFADS) works. It describes the MFADS report and the additional measurements that are available on the enhanced MFADS report. At the end of the chapter is a discussion of the QMFADS mechanized report format used with the queue management system (QMS).

MFADS report

MFADS is an optional minicomputer system that uses the data from the DMS to calculate service and work-force statistics. Statistical summaries are developed from ten-second scans of operator activity. These summaries are used to determine the number of operators required. The formats of these summaries are similar to those of the force management (FM) periodic reports printed at the SADS or FADS TTY. MFADS allows TOPS MPX FM measurements to be polled at 15- or 30-minute intervals.

MFADS extracts FM measurements from a pollable port in TOPS MPX. This port is a trunk connected to a TOPS MPX digital modem that uses the network. The minicomputer sends a two-character polling ID to initiate a data dump. TOPS MPX collects these two characters and compares them to the entries in Table OFCVAR parameter TOPS_MFADS_POLLING_ID. If there is no match, MFADS responds with an ASCII question-mark character. If the characters match, MFADS evaluates the time of the message request.

Report transmission must be completed in the current MFADS reporting period. Thirty-minute MFADS reports can be requested only in the 15-minute period immediately following data collection. Since the data collection buffers are switched between periods, MFADS reports spanning periods would result in corrupted data. As a result, the telephone company polling request is rejected if MFADS report transmission cannot be completed in the current FM period.

So, if the 30-minute report is requested and that request did not occur in the first fifteen minutes of the period, MFADS does not produce a report and responds with the ASCII characters TIME. If all conditions are met (if the

polling ID characters match and the request is within the current FM period), TOPS MPX sends the FM data to the minicomputer.

The Table OFCENG parameter TOPS_MFADS_PERIOD determines whether the TOPS MP FMX measurements are polled at 15- or 30-minute intervals. If the office parameter is set to MFADS_15_MIN, data are sent every 15 minutes. If the office parameter is set to MFADS_30_MIN (the default value), data are sent to the minicomputer every 30 minutes.

The time required to transmit an MFADS report depends on the baud rate, the number of active traffic offices, and system loading.

> *Note:* The optional enhanced MFADS feature supports two transfer rates: 300 and 1200 baud. For maximum configurations (30 traffic offices), the transfer time would be approximately five minutes at 300 baud; because of the large amount of data transmitted by enhanced MFADS, the preferred transmission rate is 1200 baud.

Enhanced MFADS position seizure measurements

Enhanced MFADS position seizure (PS) and work volume (WV) measurements can be restricted to this feature or extended, on a limited basis, to other TOPS features.

The parameter TOPS_PEG_MODE in Table OFCENG defines the scope of enhanced MFADS measurements. If this parameter is set to IPS (initial position seizures only), this feature is independent of other TOPS features except for the FORMAT field discussed (beginning on page 7-5) in this document.

If this parameter is set to PS, enhanced MFADS measurements are applied to queue thresholding, FADS, SADS, or TADS reports, operational measurements, operator feedback registers, operator study registers, and the data present in the current MFADS interface when the MFADS FORMAT field is set to FORMAT1 (or FORMAT1A), disabling enhanced MFADS reports.

This option replaces IPS-based measurements with PS measurements, because of the internal database structures. Force management maintains several measurement databases. The primary database contains data used in queue control, TOPS reports, and the MFADS interface. This database is replicated for 15-minute, 30-minute, 6-hour, and other periodic reports.

Enhanced MFADS implements a separate database that is duplicated only for 15- and 30-minute reports. When TOPS_PEG_MODE is set to IPS, new measurements are placed in the enhanced MFADS database, and pegging of the primary database is unchanged (that is, it remains IPS-based).

If TOPS_PEG_MODE is set to PS, pegging of the primary database is PS-based. That is, the database IPS fields for each queue type contain the sum of IPS plus transfer position seizures (TPS), plus recall position seizures (RPS): IPS + TPS + RPS. This pegging occurs when the enhanced MFADS database is pegged and is based on the source queue.

Since the data collected represent per-seizure measurements, the values in the IPS fields increase, and the calculation of AWT decreases. This reflects per-seizure statistics, rather than per-call data.

For example, if we assume a single queue type with 50 recalls, 100 IPS, and 1500 seconds of call-busy work volume (CBWV), the IPS-based AWT (ignoring noncall work volume [NCWV]) for this queue is 15 seconds. If PS measurements replace IPS measurements, 150 PS is recorded for the queue type. This reduces the AWT to ten seconds, the average work time required to support each PS for the queue type.

In addition to changing the pegging procedures for the primary database, the parameter TOPS_PEG_MODE in Table OFCENG also controls the pegging of PS for operational measurements and the operator feedback registers. If TOPS_PEG_MODE is set to PS, the pegging of IPS in registers IPSZ and IPSZ2 of group TOPSPSZ is based on queue type measurements. If this parameter is set to IPS, operations measurements do not change.

Similarly, when TOPS_PEG_MODE is set to PS, the data presented at an operator's position represent PS, rather than IPS, measurements. (The data displayed are based on PS, but the screen display column titles continue to indicate IPS.) If this parameter is set to IPS, the screen displays indicate the current IPS measurements.

Note: The STATPAC feature is implemented in a separate database and is not affected by the TOPS_PEG_MODE parameter in Table OFCENG.

FM statistics

TOPS MPX sends the following FM measurements to the MFADS device:
- the number of scans for TOPS MPX in XCS
- the number of IPS or PS
- work volume usage accumulated in actual work seconds
- calls-waiting usage for TOPS MPX accumulated in XCS
- occupied position usage accumulated in XCS

Note: XCS is a unit of time equal to ten seconds.

In offices equipped with the call transfer feature, TOPS MPX accumulates and sends additional FM statistics for each call transfer type. The data are calculated as explained in Chapter 4, "Force management measurement definitions." They include the following:

- number of the transfer type, 1, 2, or DA

  Note: This is provided at the beginning of the relevant by-transfer portion of the data if Table OFCVAR parameter TOPS_MFADS_OUTPUT_XFR_NUMBER is set to Y .

- calls-waiting usage for the appropriate transfer type
- number of TPS for the transfer type
- amount of work volume generated by operators assigned the call transfer type

  Note: CBWV is generated for each call type associated with each transfer type. NCWV for each transfer type is pegged for each operator in proportion to the number of transfer types in the operator's combined transfer profile.

- number of calls transferred from each traffic office
- sum of occupied positions of the appropriate transfer type for each ten-second scan

  Note: If an operator serves more than one queue, the AOP is indicated only in the highest number queue; that is, an operator serving transfer 1 (XFR1) and transfer 2 (XFR2) queues shows an AOP in XFR2 only.

If Table OFCVAR parameter TOPS_MFADS_OUTPUT_XFR_NUMBER is set to Y, MFADS provides data for all transfer types that have been datafilled in Table OFCENG parameter TOPS_TRANSFER_TYPES.

Fields 16 through 24 report repeatedly for each transfer type that was active during the report period. Fields 16a and 16b indicate the transfer type and are provided at the beginning of each transfer type portion of the MFADS report. Data are provided in the following order: XFR1, XFR2, and DA.

If parameter TOPS_MFADS_OUTPUT_XFR_NUMBER is set to N, the number of the transfer type is not presented (that is, fields 16a and 16b) at the beginning of each transfer type portion of the MFADS report. This permits downstream MFADS processors to handle MFADS data generated in the same manner as BCS22 and earlier.

In a case such as this, transfer types should be enabled in order. If XFR2 is enabled and XFR1 is not, transfer data are not processed properly at MFADS. Regardless of whether directory assistance (DA) has been enabled by parameter TOPS_TRANSFER_TYPES, DA data are not processed by MFADS. This is because pre-existing MFADS downstream processors are not capable of handling DA data.

MFADS data output strings

The MFADS data are dumped as a string of ASCII characters. The following example shows the string of ASCII data sent by the DMS to the MFADS device when Table OFCVAR parameter TOPS_MFADS_OUTPUT_XFR_NUMBER set to Y:

```
<0000001726010101 09000000 00000 00000 00180A2
1 00000000000000000000 00000 00000 2 00000000000000000000
00000 00090>
```

This sample output shows that two transfer queues were active for the period polled. The data printed are the data accumulated for the 15- or 30-minute period prior to the period polled.

The following provides an example of the string of ASCII data sent by the DMS to the MFADS device with Table OFCVAR parameter TOPS_MFADS_OUTPUT_XFR_NUMBER set to N:

```
<0000001726010101 09000000 00000 00000 00180A2
00000000000000000000 00000 00000 00000000000000000000 00000
00090>
```

This sample output shows that two transfer queues were active for the period polled. The data output are the data accumulated for the 15- or 30-minute period prior to the period polled.

The following provides another example of the string of ASCII data sent by the DMS to the MFADS device with Table OFCVAR parameter TOPS_MFADS_OUTPUT_XFR_NUMBER set to Y:

```
<0000001726010101 09000000 00000 00000 00180A1
1 00000000000000000000 00000 00000>
```

This sample output shows that one transfer queue was active for the period polled. The data output are the data accumulated for the 15- or 30-minute period prior to the period polled.

MFADS message formats

The format of the data presented on the MFADS interface is controlled by the MFADS FORMAT field. If the FORMAT field is set to FORMAT1 (or FORMAT1A), existing MFADS reports print. (The enhanced MFADS feature continues to collect measurements, but does not provide enhanced MFADS reports.) If the FORMAT field is set to FORMAT2, the enhanced MFADS reports print.

The parameter TOPS_PEG_MODE in Table OFCENG defines the type of PS measurements presented to the MFADS interface. If this parameter is set to IPS, the current call-based (IPS only) measurements are presented. If this parameter is set to PS and the format selection remains FORMAT1 (or

FORMAT1A), the format of the MFADS reports is unchanged, but the data presented in the IPS and WV fields are based on the PS and WV measurements of this feature.

Both the FORMAT selection and the type of PS measurements determine the makeup of the MFADS report. One option is to receive reports in the current message format using all IPS-based or all PS-based data for FADS, TADS, SADS, or MFADS measurements.

The other choice is to receive reports in the enhanced MFADS message format with the PS data set to IPS. An IPS setting with a FORMAT2 field selection results in IPS-based pegging for FADS, TADS, or SADS measurements, and PS-based pegging for MFADS measurements only. A PS parameter setting with a FORMAT2 field selection results in all PS-based pegging for FADS, TADS, SADS, or MFADS measurements.

Changes in the FORMAT parameter field become effective in the period following the change.

FORMAT1/FORMAT1A output
Under Busy Hour conditions, certain fields in the MFADS FORMAT1 reports may overflow. The affected fields may be extended in an optional MFADS format, which is selected by datafilling FORMAT1A in the FORMAT field for the MFADS tuple entry in Table TOPSDEV.

Table 7-1 explains the output message format for field selection FORMAT1 and FORMAT1A. The value under the Number of characters heading indicates the size of the original MFADS format field (FORMAT1), in characters, followed by a slash (/), and then the size when FORMAT1A has been selected. For example, 5/6 indicates a field size of 5 characters for FORMAT1 and 6 characters for FORMAT1A. Unaffected fields show a single size value.

Table 7-1
FORMAT1/FORMAT1A current MFADS message format

Field number	Number of characters	Field description
1	1	Start of message character (ASCII "<" value)
2	6	TOPS office identifier (datafilled in Table OFCENG parameter OFFICE_ID_ON_AMA_TAPE)
3	4	Time - hour/minute corresponds to the last FM 15- or 30-minute report
-continued-		

Table 7-1
FORMAT1/FORMAT1A current MFADS message format (continued)

Field number	Number of characters	Field description
4	4	Date - day/month
5	2	Number of traffic offices
6	1	Space
7	3	Actual number of ten-second scans in the period (number of scans in the nontransfer [non-XFR] or general [GEN] queue, since it is always active).
8	5/7	Sum of the calls-waiting XCS for the non-XFR, non-XFR recall, and centralized automatic message accounting (CAMA) queues this period. (This number is divided by 10 and rounded to make the unit ten call seconds (XCS).
9	1	Space
10	5/6 for each traffic office	Sum of IPS handled during the period. Includes transfer (XFR1, and XFR2), CAMA, and GEN or non-XFR queues. No calls in the recall queues are counted. (In a multitraffic office, this field is printed repeatedly for each traffic office, starting with traffic office number 1.)
11	1	Space
12	5/7 for each traffic office	Total work volume XCS, including CBWV and NCWV. In a multitraffic office, this field is printed repeatedly for each traffic office, starting with traffic office number 1. (This number is divided by 10 and rounded to make the unit ten call seconds (XCS).
13	1	Space
14	5/6 for each traffic office	Total occupied positions XCS. Transfer and nontransfer positions. (In a multitraffic office, this field is printed repeatedly for each traffic office, starting with traffic office number 1.)
15	2	Additional measurements indicator: A0 = no additional statistics generated A1 = transfer 1 statistics generated A2 = transfer 2 statistics generated A3 = DA statistics generated
		-continued-

Table 7-1
FORMAT1/FORMAT1A current MFADS message format (continued)

Field number	Number of characters	Field description
16	1	Space
16a	1	Transfer type of information to follow: 1 = information for transfer 1 2 = information for transfer 2 3 = information for DA This field is printed *only* if Table OFCVAR parameter TOPS_MFADS_OUTPUT_XFR_NUMBER is set to Y.
16b	1	Space. This field is printed *only* if Table OFCVAR parameter TOPS_MFADS_OUTPUT_XFR_NUMBER is set to Y.
17	5/7	Calls-waiting XCS for the appropriate transfer type (XFR1, XFR2, DA). In a multitraffic office, this value is the system transfer type data.
18	5/6	IPS for the appropriate transfer type (XFR1, XFR2, DA). In a multitraffic office, this value is the system transfer type data.
19	5/6	IPS for the appropriate transfer type (XFR1, XFR2, DA). (This field is the same as field 18). In a multitraffic office, this value is the system transfer type data.
20	5/7	For the appropriate transfer type, the work volume accumulated by operators during the period, calculated as in "Call transfer statistics," on page 5-21. In a multitraffic office, this value is the system transfer type data.
21	1	Space
22	5/6 for each traffic office	For the appropriate transfer type, the number of calls transferred. In a multitraffic office, this field is printed repeatedly for each traffic office, starting with traffic office number 1.
23	1	Space
		-continued-

Table 7-1 FORMAT1/FORMAT1A current MFADS message format (continued)		
Field number	**Number of characters**	**Field description**
24	5/6 for each traffic office	For the appropriate transfer type, total occupied positions at the end of each ten-second scan. In a multitraffic office, this field is printed repeatedly for each traffic office, starting with traffic office number 1.
25	1	End of message character (ASCII ">" sign)
End		

Note 1: Before the MFADS format is changed from FORMA T1 to FORMAT1A, the device to which MFADS data is sent must be upgraded to handle the larger field sizes of FORMA T1A.

Note 2: FORMAT2 is unaffected by the existence of FORMA T1A.

FORMAT2 output

The enhanced MFADS report configuration differs from the FORMAT1 (or FORMAT1A) configuration; however, the MFADS message is presented as a fixed-length ASCII field. Numeric fields are decimal and are padded with leading zeros when required. One limitation is that work volumes in FORMAT2 are presented as a six-digit field. This restricts the maximum number of operators supported by the new format to 555 per traffic office (team).

Enhanced MFADS messages are enclosed in message start and end characters. Each message contains two levels of information: message and system data, and a series of traffic office reports. The message and system data portion of an MFADS message includes a TOPS office identifier, time and date of the message transmission, system-level period and queue type (CAMA, GEN, XFR1, XFR2, and DA), service (toll and assist [TA], DA, and intercept [INTC]), and extended nonqueue work volume (NQWV) measurement reports for each traffic office. The output message format for field selection FORMAT2 is illustrated in Table 7-2.

Note 1: CAMA is not an applicable call type in a TOPS MPX DA environment. It appears as a category on reports, however, (followed always by zeros) and is calculated by the system in the same way as for TOPS MP . For that reason there are references to CAMA in this chapter.

Note 2: If the number of traffic offices is zero, MFADS reports terminate after field 8 with an end-of-transmission character.

Table 7-2
FORMAT2 enhanced MFADS message format

Field number	Number of characters	Field description
1	1	Start of MFADS transmission character, indicated by an ASCII "<" character
2	6	The TOPS office identifier datafilled in parameter OFFICE_ID_ON_AMA_TAPE in Table OFCENG
3	4	Time of report transmission (hhmm)
4	4	Date of report transmission (day)(month)
5	4	MFADS period, identifying the actual reporting period in seconds
6	3	Number of ten-second scans that occurred in this reporting period
7	5 x 6	Calls-waiting, presented by queue, based on 10-second scans of each queue type. Each field contains an XCS total of the nonrecall and recall calls-waiting for both active and inactive queues. (Inactive queues have a CW value of zero.)
8	2	Number of active traffic offices, indirectly based on parameter TOPS_NUM_TRAFFIC_OFFICES in Table OFCENG
		Traffic office 1...n measurements (TO reports) (216 characters per traffic office)
9	1	End-of-MFADS transmission, indicated by an ASCII ">" character

Traffic office reports

When the enhanced MFADS feature is implemented and FORMAT2 is selected, traffic office reports follow the message and system data message portion of the MFADS report. Traffic office reports begin with data for traffic office 1, are followed by data for traffic office 2, and end with data presented for the last active traffic office.

Each traffic office report contains a series of queue, service, and extended measurement (NQWV) reports. Assuming all queue and service types are active, the order of these reports is as follows:

- GEN queue
- XFR1 queue
- XFR2 queue
- DA queue
- TA service
- INTC service
- DA service
- NQWV

Queue reports

Traffic office reports begin with reports for each active queue type. Since the GEN queue types is always active, the minimum number of queue reports is two. The maximum number, five, is set by datafill of parameter TOPS_TRANSFER_TYPES in Table OFCENG for the optional XFR1, XFR2, and DA queue types.

The order of the queue reports is fixed. When each queue report is transmitted, the type of report is determined by a header field that identifies queue type. For example, if TOPS_TRANSFER_TYPES defines DA as the only active optional queue type, a total of three queue reports are transmitted for each traffic office. When these queue reports are transmitted, the queue types are identified by the header fields Q0 through Q3. The output message format for field selection FORMAT2 is illustrated in Table 7-3.

Table 7-3
GEN, XFR1, XFR2, and DA (Q0, Q1, Q2, and Q3) queue report formats

Field number	Number of characters	Field description
1	2	Queue type, where Q0 = GEN, Q1 = XFR1, Q2 = XFR2, and Q3 = DA queues
2	6	The number of IPS for queue types in the current MFADS period
3	6	The number of TPS for queue types in the current MFADS period
4	6	The number of RPS for queue types in the current MFADS period
5	6	CBWV for the traffic office queue type, Q0 through Q3, in seconds
6	6	NCWV for the traffic office queue type, Q0 through Q3, in seconds
7	6	Idle work volume time for the traffic office queue type, Q0 through Q3, in seconds

Service reports

After the active queue reports are produced, enhanced MFADS presents
service reports for the TA, DA, and INTC services. The order of the service
reports is fixed, and the reports are presented only for active services.
Transmission of the optional DA and INTC reports is determined by datafill
in Table SERVICES. Each service report includes a header that identifies
the service type being reported. The output message format for field
selection FORMAT2 is illustrated in Table 7-4.

Table 7-4
TA, DA, and INTC (S0,S1, S2) service report formats

Field number	Number of characters	Field description
1	2	Service type S0 = TA, S1 = DA, and S2 = INTC services.
2	6	Service initiations, total number occurring for the service type in the current MFADS period
3	6	Service work volume, total WV for the service type in the current MFADS period

Extended measurement report

Once the service reports are produced, enhanced MFADS presents the extended measurement report. This report specifies the NQWV for enhanced MFADS total WV calculations. The output message format for field selection FORMAT2 is illustrated in Table 7-5.

Table 7-5
NQWV extended measurement report

Field number	Number of characters	Field description
1	2	Measurement type of the data in this report (for this feature, limited to the value MO)
2	6	NQWV for the traffic office in the current MFADS period

STATSPAC force management capability

STATSPAC is an optional feature for generating FM statistics. When connected to an operating company-provided device, it delivers raw data about every operator logged on during a defined interval.

The STATSPAC feature eliminates the need for study registers by sending all FM data directly to the operating company device. This feature provides the raw data needed for the operating company to perform its own statistical analysis. It also allows the operating company to choose the format of the report.

The following raw data are delivered to the operating company device for each 15- or 30-minute time interval:

- operator number
- operator team number

- number of logons and logoffs
- operator idle time in seconds
- IPS for each call type
- work volume for each call type

Enhanced MFADS does not apply to STATSPAC measurements and study registers. STATSPAC is implemented in a separate database and is not affected by parameter TOPS_PEG_MODE. PS-based measurements do not replace IPS-based measurements for the STATSPAC feature.

QMFADS reports

When an operating company has QMS, reports are printed on the QMFADS device. The following section describes the format used to print the QMFADS mechanized reports.

> *Note:* Parameter QMSFM_BASIC in Table TQMSOPT enables or disables the collection and reporting of TOPS QMS basic statistics. When this parameter is set to N, the DMS does not generate reports at QMFADS, QFADS, or QTADS devices, or update real-time QMS information on the FMCRT, IC, or SA positions. Operator feedback statistics are frozen. L, P , F, R, and C commands are disabled. Setting QMSFM_BASIC to N saves CPU time that would have been spent collecting, collating, and reporting system data. When QMSFM_BASIC is set to Y (the default), the DMS generates real-time displays and reports and enables QMS force management commands.

QMFADS report format

Data in a QMFADS mechanized report is presented in fixed-length ASCII fields. When required, numeric fields are padded with leading zeros.

QMFADS reports are encapsulated within report begin and end characters. Each report contains report/system general information, as well as information on QMS queues, QMS teams, and QMS services.

A QMFADS report prints a record for a traffic office if and only if that traffic office is datafilled with an ACD type of QMS in Table TEAMACD.

The report/system information portion of a QMFADS mechanized report includes a TOPS office identifier, the time and date of the report transmission, and the length of the report period.

Table 7-6 illustrates the QMFADS report format.

Table 7-6
QMFADS report format

Field number	Number of characters	Field description
1	1	Start of QMFADS transmission character, indicated by an ASCII "<" character
2	6	TOPS office identifier datafilled in parameter OFFICE_ID_ON_AMA_TAPE in Table OFCENG
3	4	Starting time of QMFADS report transmission in a 24-hour (hhmm) format
4	4	Starting date of QMFADS report transmission in a month day (mmdd) format
5	4	QMFADS period, identifying the actual reporting period of the QMADS report, in seconds

Note: At 15-minute intervals, QMS FM statistics are collected into one of two alternating sets of buffers. At any given time, one buffer contains data currently being collected, while the other contains measurements for the preceding period. This second buffer is used in all the QMS FM reports. The buffers are switched after every 15-minute period. The actual time when this switch occurs is subject to small system discrepancies and may not happen exactly on the 15-minute boundary. Thus, the measurements in a QMFADS report may represent data collected over a period slightly greater or less than 15 minutes. This field shows the *actual* reporting period, which is the measurement used in calculating AOP.

6	2	Number of call queues (the total number of QMS call services reported on)

Note: CW is the total amount of time (in seconds) that calls spent waiting in a particular queue. The number of call queues is needed in order to determine the number of CW records. One CW record is sent for each QMS call queue. It records the total amount of CW time pegged against a queue during the last QMFADS report period. The QMFADS report sends CW records for QMS call queues 0 to (QMSFM_NUM_SERVICES-1), in numerical order.

Call waiting record (8 characters per record)

.
.
.

7	2	Number of traffic office (team) records sent with the report

-continued-

Table 7-6
QMFADS report format (continued)

Field number	Number of characters	Field description
Traffic office record		
		. . .
8	1	End of QMFADS transmission character, indicated by an ASCII ">" character
End		

Traffic office record format

Table 7-7 shows the format of a QMS traffic office (team) record.

Table 7-7
Traffic office record format

Field number	Number of characters	Field description
1	2	Traffic office (a two-digit ID between 1 and 30, identifying the traffic office to which this record corresponds)
2	8	The amount of non-call work volume (NCWV) pegged against this traffic office during the report period, measured in seconds
3	8	The amount of idle time (IDLT) pegged against this traffic office during the report period, measured in seconds
4	8	Average occupied positions work volume (AOPWV)
Note: This work volume measurement, in seconds, is necessary to accurately calculate the average occupied positions and percent occupancy for the traffic office. The value of this measurement differs from the sum of the NCWV and CBWV generated by operators in the traffic office. For more information on how AOPWV is measured, see "Calculating AOP and %OCC," in Chapter 4, Force management measurement definitions, p. 4-31.		
5	8	Average occupied positions idle time (AOPIDLT)
-continued-		

Table 7-7
Traffic office record format (continued)

Field number	Number of characters	Field description
Note: This the idle time measurement, in seconds, is necessary to accurately calculate the average occupied positions and percent occupancy for the traffic office. The value of this measurement differs from the value of the IDLT measurement.		
6	2	Number of QMS call queue records sent in the traffic office record. (The value in this field equals the value of the office parameter QMSFM_NUM_SERVICES.)
Call queue record (26 characters per call queue record)		
. . .		
7	2	Number of QMS service records sent in the traffic office record. (The value of this field equals the value of the office parameter QMSFM_NUM_SERVICES.)
Service record (14 characters per service record)		
. . .		
End		

One traffic office record is sent for each traffic office datafilled as QMS in Table TEAMACD.

Queue record format

Table 7-8 shows the format of a QMS call queue record.

Field number	Number of characters	Field description
Table 7-8 **Queue record format**		
1	2	The number of initial position seizures (IPS) pegged against the queue in the report period
2	8	The number of recall position seizures (RPS) pegged against the queue in the report period
3	8	The number of transfer position seizures (TPS) pegged against the queue in the report period
4	8	The amount of call busy work volume (CBWV) pegged against the queue in the report period, measured in seconds

The first queue record contains data for call queue 0, the second contains data for call queue 1, the third contains data for call queue 2, and so forth. The number of call queue records sent for each traffic office equals the value of the new office parameter QMSFM_NUM_SERVICES in Table OFCENG.

The data sent in a queue record is accumulated only for calls of that queue type that were handled by operators in the associated team. Data for calls handled by other teams is sent in the queue records for those teams.

Service record format

Table 7-9 shows the format of a QMS service record.

Field number	Number of characters	Field description
Table 7-9 **Service record format**		
1	6	The number of times a service initiation (SI) was pegged against this service during the report period
2	8	Service work volume (SWV), the total amount of call work volume pegged against this service during the report period, measured in seconds

The first service record contains data for service 0, the second contains data for service 1, the third contains data for service 2, and so forth. The number of service records sent to the QMFADS device equals the value of the office parameter QMSFM_NUM_SERVICES in Table OFCENG.

Interactions with TOPS ACD MFADS

The QMFADS device may exist in the same office as a TOPS ACD MFADS device. When this combination occurs, the MFADS device continues to print reports for traffic offices 1 up to the number specified in the parameter TOPS_MAX_TRAFFIC_OFFICES, even for traffic offices that are datafilled as QMS in Table TEAMACD.

When reports for traffic offices datafilled as QMS in Table TEAMACD are printed at MFADS devices, however, all fields are zeroed. Traffic office information for traffic offices datafilled as QMS in Table TEAMACD should be discarded from the MFADS reports.

Using the QMFADS device

A QMFADS report is sent to the QMFADS device following the QMSFM_POLLING_ID parameter in Table TQMSOPT. Each report contains data gathered during the preceding 15-minute period. For instance, a report printed at 1:17 would contain the data accumulated from between 1:00 and 1:15.

After the polling ID is received, the DMS formats a buffer with the QMS force management data collected from the previous period and sends it to the QMFADS device. The DMS can transmit data at either 300 or 1200 bps. If the entire report cannot be sent during 15 minutes, there is a risk of missing some reports. This should be noted when datafilling services and traffic offices, and when determining a modem baud rate.

If a report requires too much time, the QMFADS prints a message. Receiving this message indicates that the number of queues needs to be reduced.

ACD TTY commands, queries, and reports

This chapter describes the commands and queries entered at the system administration data system (SADS), force administration data system (FADS), and traffic office administration data system (TADS) teletypewriters (TTYs) and the reports generated by them. The TTYs referred to in this chapter are defined in Chapter 2, "Work force office configurations."

The TTY commands, queries, and reports described in this chapter apply to automatic call distribution (ACD). Chapter 9, "QMS TTY commands, queries, and reports," describes the commands, queries, and reports used in the Queue Management System (QMS).

The non-QMS commands, queries, and reports discussed in this chapter are grouped according to their functions as follows:

- force management (FM) and traffic office (TO) periodic reports
- operator feedback system
- operator study data system
- call transfer
- controlled traffic
- position control
- call distribution
- silence Sonalert tone
- position information
- information on operators

Table 8-1 lists all the commands discussed in this chapter and specifies where they are described.

Table 8-1
Subsection to commands, queries, and reports cross-reference

Subsection	Command/query/report
FM and TO periodic reports	M15, M30, FM15, FM30, FM6HR, FM24HR, TO15, TO30, TO6HR, TO24HR
Operator feedback system	FD, FI, FZ
Operator study data system	RA, RR, RQ, RD, RT
Call transfer	X..I, X..X, XA, XD, X
Controlled traffic	T..I, T..X, T
Position control	O, I
Call distribution	AM, AX, AD, AQ
Silence Sonalert tone	S
Position information	O
Information on operators	L, P

In many cases, commands and queries are not available on all of the TTY types. A command may be available at a FADS and SADS TTY, for example, but not at a TADS TTY. Such restrictions are indicated in the command description. These restrictions are based on the office configuration in use. In addition, Table 8-2 provides a list of the TTY devices and the commands they accept.

Table 8-2
Device to command cross-reference

Device	Commands it accepts
SADS	M15, M30, FD, FI, FZ, RA, RR, RQ, RD, XA, XD, X...I, X...X, X, T...I, T...X, T, B, BX, BE, O, I, AM, AX, AD, AQ, L, P, HO, HI, H
TADS	M15, M30, FD, FI, FZ, RA, RR, RQ, RD, X...I, X...X, X, T...I, T...X, T, B, BX, BE, O, I, L, P, HO, HI, H
FADS	M15, M30, RT, XA, XD, B, BX, BE, AM, AX, AD, AQ, S, HO, HI, H

In this chapter, an input prompt (>) indicates that the subsequent information is a command. Capital letters represent commands, fixed parameters, and responses from the TTY. Enter the command or fixed parameter exactly as it appears on the page. Lowercase letters represent variables. For commands and parameters, enter the letters or numbers that the variable represents. At the TTY, type in the command and press the **RETURN** key. All commands and queries entered at the TTY *must* be followed by a carriage return.

When any part of a command is not accepted by the system, a question mark (?) is printed at the TTY on which the command was issued, and no action is taken.

FM and TO periodic reports

The FADS TTY allows the force supervisor to print and modify system information without reference to individual operators. The four FM and four TO periodic reports listed in Table 8-3 provide force management data.

Table 8-3
FM and TO periodic reports

Reports	Purpose
FM15 and TO15	Provide 15 minutes of data accumulation
FM30 and TO30	Provide 30 minutes of data accumulation
FM6HR and TO6HR	Provide 6 hours of data accumulation
FM24HR and TO24HR	Provide 24 hours of data accumulation

The FM reports are printed at a FADS TTY for a multitraffic office configuration and at a SADS TTY for a single-traffic office configuration. The TO reports apply to a multitraffic office configuration only. They are printed in the traffic office at the TADS TTY.

Except for FM15 and TO15, all the reports are generated automatically at specified time intervals. These intervals are all relative to the system start-of-day time, which is set by the operating company through an office parameter.

In a multitraffic office, the TO reports provide data for the whole system and for the traffic office in which they are generated. The FM reports provide overall system data and data for each traffic office within the multitraffic office configuration.

All of the FM and TO reports start with a header that specifies the type of report, the time period covered, the date, and the actual number of scans made by the DMS during that time period.

Enhanced MFADS

The enhanced MFADS feature allows extension of the position seizure (PS) measurements from initial position seizure (IPS) only to include IPS, transfer position seizures (TPS), and recall position seizures (RPS). The way to extend the PS measurements is to change the setting of the TOPS_PEG_MODE parameter in Table OFCENG to PS instead of IPS. The extended PS and work volume (WV) measurements replace the IPS and WV measurements used in FADS or TADS reports.

The only visible change to the FADS or TADS display format is that IPS labels are replaced by PS labels. (The French display changes from PPP to PP when this parameter is sent to PS.)

The following are the primary changes in the data presented:

- The IPS data fields are replaced with total PS, (where PS is the sum of IPS + TPS + RPS), for the respective system and queue level displays.
- PS replaces IPS in the calculation of AWT and other calculations that rely on IPS only.

With a PS setting, the resulting display reflects statistics for each seizure rather than each call.

When the enhanced MFADS feature is implemented, caution should be exercised when changing the parameter TOPS_PEG_MODE to either IPS or PS. If that parameter is changed, the 30-minute, 6-hour, and other FM reports will reflect a mixture of IPS and PS pegging procedures. To avoid ambiguous reports, this parameter should be changed only before the start-of-day defined in Table OFCENG or before a cold restart.

Contents of periodic reports

The information shown in Table 8-4 appears in the periodic reports.

Table 8-4 TOPS MPX status displays in periodic reports	
Printed display	**Meaning**
IPS (initial position seizures)	Is increased by one when any new call reaches an operator position. (This does not include recalls.)
WV-CCS (work volume in hundred call seconds)	Reflects the work volume accumulated by all operators whenever they are unavailable to receive a new call for any reason.
CW-CCS (calls waiting in hundred call seconds)	Reflects the number of calls waiting for an idle operator during the sample period.
AWT (average work time)	Reflects the average work time of the operator work force. AWT is measured by dividing the work volume accumulated (in seconds) by the number of IPS.
ANS (speed of answer)	Reflects the answer delay encountered by customers waiting for an operator. ANS is measured by dividing the calls waiting for an operator by the number of IPSs added within the sample period.
AOP (average occupied positions)	Reflects the average number of positions occupied within the sample period.
BDH (board hours)	Reflects the total number of positions occupied during the report period. BDH is calculated by multiplying AOP by the report period expressed in hours.
%OCC (percent occupancy)	Reflects the ratio of operator time spent handling calls to the total time operators are assigned. %OCC is calculated by dividing CBWV + NCWV + IDLT into CBWV + NCWV and multiplying by 100 to obtain a percentage.

Note: Not every field in this list appears on every report. For example, FM15 and FM30 do not include BDH.

Report contents when call transfer is active

If the call-transfer feature is active, statistics are also included to break the global statistics into their nontransfer (non-XFR) and transfer (XFR) components. The information for each active XFR type is printed separately.

If call transfer is active, the information shown in the following tables is included in all the periodic reports printed at the FADS and TADS.

For non-XFR calls, the system information in Table 8-5 is printed.

Table 8-5
Displays for non-XFR calls

Printed display	Definition
IPS	Total IPS for all operators able to handle non-XFR calls
WV-CCS	Total accumulated work volume for all operators able to handle non-XFR calls
AWT	Ratio of accumulated work volume to IPS for all operators
AOP	Average occupied positions for all operator positions that are able to handle only non-XFR calls (no XFR capability)
%OCC	Ratio of operator time spent handling calls to the total time operators are assigned to positions for handling calls
ANS	The number of seconds the average call waits for attachment to a position during a given period
CW-CCS	Calls waiting, expressed in hundred call seconds

The traffic office information shown in Table 8-6 is also included in the reports. (The FADS provides statistics for all traffic offices, but the TADS provides statistics only for the traffic office in which it is located.)

Table 8-6
Traffic office information displays for non-XFR reports

Printed display	Definition
AOP	Shown as for the system AOP, but for each traffic office
AWT	Shown as for the system AWT, but for each traffic office. (This AWT, however, is weighted. It allows for the difference between the percentage of non-XFR positions in each traffic office and in the system.)

For XFR calls, the system information in Table 8-7 is printed (one report for each active XFR type).

Table 8-7
Displays for XFR calls

Printed display	Definition
IPS	Total IPS for all operators able to handle calls of the given XFR type
WV-CCS	Total accumulated work volume for all operators able to handle calls of the given XFR type
CW-CCS	Volume of calls waiting in the given XFR queue
AWT	Ratio of accumulated work volume to IPS for all operators able to handle the given XFR type
ANS	Ratio of calls waiting in the given XFR queue to the IPS pegged for calls of the given XFR type
AOP	For transfer 1 (XFR1) report, all operators who have XFR1 call-handling capability but not transfer 2 For transfer 2 (XFR2) report, all operators who have XFR2 call-handling capability
XFR OUT	The number of calls transferred from one position to another. This field is unique to XFR reports.
%XFR	Ratio of total calls transferred (for the given transfer type) to the total of non-XFR calls. This field is unique to XFR reports.
%OCC	Ratio of the portion of operator time spent handling calls to the total time operators are assigned to positions for that purpose

The traffic office information shown in Table 8-8 is also included in the XFR reports. (The FADS provides statistics for all traffic offices, but the TADS provides statistics only for the traffic office in which it is located.)

Table 8-8
Traffic office information displays for XFR reports

Printed display	Definition
AOP	Shown as for the system AOP, but for each traffic office
AWT	Shown as for the system AWT, but for each traffic office.

For more information about these fields, including how they are calculated, refer to Chapter 4, "Force management measurement definitions."

FM15 and TO15 reports

The periodic 15-minute accumulation of force management statistics is necessary for analyzing the distribution of work volume CCS within half hours. The preparation of basic schedules and the weekly force-estimating process both require knowledge about quarter-hourly work volume distribution. Fifteen-minute statistics, accumulated for the same period over several days, often indicate how the operator schedules can be fine-tuned to achieve service and efficiency.

Since the 15-minute reports do not print automatically, a command (M15) must be entered at the TTY to request their output. If the command is entered at a SADS or FADS, FM15 reports are printed. If the command is entered at a TADS, TO15 reports are printed. The following example illustrates the format of the command. Always press **RETURN** after typing a command (except in the case of the S command, used to silence the Sonalert).

Enter the following command at a SADS, FADS, or TADS TTY:

>M15

The TTY responds in the following way:

```
M15 OK
```

The 15-minute report prints every 15 minutes until the M30 command is entered to halt printing. To stop the printing of FM15 reports, enter the M30 command at the SADS or FADS, whichever applies. To stop the printing of TO15 reports, enter the M30 command at the TADS. The following example illustrates the format of the command.

Enter the following command at a SADS, FADS, or TADS TTY:

>M30

The TTY responds in the following way:

```
M30 OK
```

Examples of FM15 and TO15 reports

The FM15 periodic report is printed at a SADS. The TO15 periodic report is printed at a TADS. Examples of these reports are shown in Figure 8-1. FM15 periodic reports are also printed at a FADS. FM15 periodic reports at a FADS include all of the information listed in Figure 8-1 as well as the IPS or PS, WV-CCS, ANS, AWT, AOP, and %OCC for each traffic office within that system.

If call transfer is active in a multitraffic office, statistics are provided on a queue basis (general [GEN], XFR1, XFR2, and transfer directory assistance [XFR DA]).

Figure 8-1xxx
Examples of FM15 and TO15 periodic reports

```
    FM15  05:45-06:00    89/03/02    90 SCANS

          IPS   WV-CCS   ANS   CW-CCS    AWT   AOP   %OCC
    SYST   12       2   0.0        0   18.2   1.9     13
    NCAMA   9       2   0.0        0   21.9
    CAMA    0       0   0.0        0    0.0


     TO15  12:45-13:00    89/03/12    90 SCANS

          IPS  WV-CCS   ANS   CW-CCS    AWT    AOP   %OCC
    SYST  269      56   1.6        4   20.6    8.4     73
    NCAMA 157      48   1.5        2   30.8
    CAMA    0       0   0.0        0    0.0

    TO 2  176      35                 19.9    5.4     72
```

Note 1: If the enhanced MFADS feature is in effect, and parameter TOPS_PEG_MODE in Table OFCENG is set to PS, then all the periodic reports show PS instead of IPS statistics.

Note 2: CAMA is not an applicable call type in a TOPS MPX DA environment. It appears as a category on reports, however, (followed always by zeros) and is calculated by the system in the same way as for TOPS MP . For that reason there are references to CAMA in this chapter.

FM30 and TO30 reports

The 30-minute reports are printed automatically every 30 minutes on the hour and half hour. No TTY command is required to generate the 30-minute

report. The FM30 reports are printed at the SADS or FADS TTY. The TO30 reports are printed at the TADS TTY.

Examples of FM30 and TO30 reports

Figure 8-2 provides an example of an FM30 periodic report printed at a SADS in a single-traffic office that has call transfer active. TO30 reports provide the same information; however, in addition to providing the system statistics, they also provide the statistics for the traffic office in which they are printed.

Figure 8-3 provides an example of the FM30 report printed at a FADS. The statistics provided in this report are for all of the traffic offices in the system.

Note that when call transfer is active, statistics are broken down by queue (GEN, XFR1, XFR2, and XFR DA).

Figure 8-2xxx
Examples of FM30 periodic reports with call transfer (single-traffic office)

```
   FM30  11:00-11:30    89/03/02   180  SCANS

         IPS  WV-CCS   ANS  CW-CCS   AWT   AOP   %OCC
SYST    155     49    2.2       4  32.2  13.0    21
NCAMA   107     36    2.2       2  33.4
CAMA      0      0    0.0       0   0.0


NON XFR  OPRS
         IPS  WV-CCS   ANS CW-CCS   AWT   AOP   %OCC

SYST     59     18    2.2      1  29.7   5.0    20


XFR 1  OPRS   11:00-11:30   180 SCANS    %XFR = 39.0
         IPS  WV-CCS   ANS CW-CCS    AWT  AOP   %OCC  XFR OUT

SYST     32      7    2.8      1  21.9  2.0    19        23


XFR 2  OPRS   11:00-11:30   180 SCANS    %XFR = 15.2
         IPS  WV-CCS   ANS CW-CCS   AWT  AOP   %OCC  XFR OUT

SYST     32     12    2.8      1  38.7  3.0    23         9


XFR DA  OPRS   11:00-11:30   180 SCANS    %XFR = 15.2
         IPS  WV-CCS   ANS CW-CCS   AWT  AOP   %OCC  XFR OUT

SYST     32     12    2.8      1  38.7  3.0    23         9
```

Figure 8-3
Examples of FM30 periodic reports with call transfer (multitraffic office)

```
   FM30   15:00-15:30    89/03/02    180   SCANS

            IPS  WV-CCS   ANS  CW-CCS     AWT   AOP  %OCC
   SYST     3794    866   0.6      22    22.8  55.9    86
   NCAMA    2960    782   0.6      18    26.4
   CAMA        0      0   0.0       0     0.0

   TO 1     1352    290                  21.4  18.6    87
   TO 2     2436    550                  22.6  35.2    87
   TO 3        6     26                 432.2   2.2    67
   NON XFR  OPRS
            IPS  WV-CCS   ANS  CW-CCS     AWT   AOP  %OCC

   SYST     3788    840   0.6      22    22.2  53.8    87

   TO 1     1352    290                  21.4  18.6
   TO 2     2436    550                  22.6  35.2
   TO 3        0      0                     0     0
   XFR 1  OPRS   15:00-15:30    180 SCANS    %XFR =   0.0
                                                           XFR
            IPS  WV-CCS   ANS  CW-CCS     AWT   AOP  %OCC   OUT

   SYST        0      0     0       0       0     0     0     0

   TO 1        0      0                     0     0           0
   TO 2        0      0                     0     0           0
   TO 3        0      0                     0     0           0
   XFR 2  OPRS   15:00-15:30    180 SCANS    %XFR =   0.0
                                                           XFR
            IPS  WV-CCS   ANS  CW-CCS     AWT   AOP  %OCC   OUT

   SYST        0      0     0       0       0     0     0     0

   TO 1        0      0                     0     0           0
   TO 2        0      0                     0     0           0
   TO 3        0      0                     0     0           0
   XFR DA OPRS   15:00-15:30    180 SCANS    %XFR =   0.0
                                                           XFR
            IPS  WV-CCS   ANS  CW-CCS     AWT   AOP  %OCC   OUT

   SYST        6     22     0       0   370.7   2.2    57     0

   TO 1        0      0                     0     0           0
   TO 2        0      0                     0     0           0
   TO 3        6     22                 370.7   2.2           0
```

FM6HR and TO6HR reports

The 6-hour reports are automatically printed 6, 12, 18, and 24 hours after the system start of day. The 6-hour reports provide call type summaries. In addition, the AOP is converted to BDH.

Examples of FM6HR and TO6HR reports

Figure 8-4 provides an example of an FM6HR periodic report printed at a SADS TTY and a TO6HR periodic report printed at a TADS TTY. In the FM6HR periodic reports printed at a FADS, statistics are provided for each traffic office in the system. If call transfer is active in the office, the statistics are provided on a per-queue basis (GEN [or non-XFR], XFR1, XFR2, and XFR DA).

Figure 8-4xxx
Examples of FM6HR and TO6HR periodic reports

```
   FM6HR  00:00-06:00   89/03/02   2160  SCANS

          IPS WV-CCS   ANS  CW-CCS   AWT   BDH   %OCC
SYST      350    127   1.6      6   36.2  12.3   29
NCAMA     291    124   1.8      5   42.1
CAMA        0      0   0.0      0    0.0

SYST CALL TYPE  IPS    AWT

DELAY             3   11.3
RECALLS           2    5.0
CAMA-1PLUS       59    5.1
OVERSEAS          5   70.2
NCN-0MINUS      114   63.4
CN-0MINUS        59   29.6
NCN-0PLUS        46   26.2
CN-0-1PLUS       22   22.3
HOTEL            39   26.6
COMBINED          3   36.3


  TO6HR  00:00-06:00   89/03/02   2160  SCANS

          IPS WV-CCS   ANS  CW-CCS   AWT   BDH   %OCC
SYST      444    134   0.8      4   30.3  13.9   27
NCAMA     353    127   0.8      3   36.0
CAMA       91      6   1.0      1    6.8
TO 2      444    134                30.3  13.9   27

SYSTEM CALL TYPE   IPS       AWT

RECALLS             0          0
411                 1        3.0
555-HOM            91        6.8
555-FOR            14       61.4
131               139       44.6
141                59       35.6
 *** unidentified  50       30.9
COMBINED           50       18.9
DELAY              39       23.2
```

FM24HR and TO24HR reports

The 24-hour reports provide force management data for the previous 24 hours. They are generated automatically at the start of day. In the 24-hour reports, AOP is converted to BDH.

Example of FM24HR and TO24HR reports

The example of the FM24HR periodic report provided in Figure 8-5 is printed at a SADS. The example of the TO24HR periodic report in Figure 8-6 is printed at the TADS. The TO24HR periodic report includes the system statistics and the individual statistics for the traffic office in which the report is printed.

FM24HR periodic reports printed at a FADS include system statistics and the statistics for each traffic office in the system. In addition, if call transfer is active, the statistics are broken down by queue (GEN [or non-XFR], XFR1, XFR2, and XFR DA).

Figure 8-5xxx
Example of FM24HR periodic report

```
      >FM24HR  06:00-06:00    90/03/12   8640  SCANS

           IPS  WV-CCS   ANS  CW-CCS   AWT    BDH    %OCC
  SYST    22308    5152   2.2     482   23.1  200.2    71
  NCAMA   22308    5130   2.2     482   23.0
  CAMA        0       0   0.0       0    0.0

  TO1      8072    1786                 22.1   76.9    65
  TO2     14235    3366                 23.6  123.4    76


  SYSTEM CALL TYPE
                        IPS      AWT
  DA RCL                220     31.7
  555                  8593      5.5
  131                    56     37.1
  555-HOM              5441     39.2
  555-FOR              2383     33.9
  411                  2945     28.9
  INT-ANIF/ONI         1528     31.5
  INT-CUT/SPL          1332     25.8
  Combined/Unidentified  30     80.9


  TO1 CALL TYPE
                        IPS      AWT
  DA RCL                 82     28.1
  555                  3193      5.1
  131                    24     53.0
  555-HOM              1953     39.4
  555-FOR              1200     38.8
  411                  1053     28.5
  INT-ANIF/ONI          520     28.7
  INT-CUT/SPL           119     34.9
  Combined/Unidentified  11     56.6


  TO2 CALL TYPE
                        IPS      AWT
  DA RCL                138     33.9
  555                  5400      5.7
  131                    32     50.0
  555-HOM              3327     39.1
  555-FOR              1546     34.5
  411                  1892     29.9
  INT-ANIF/ONI         1008     33.2
  INT-CUT/SPL           161     26.9
  Combined/Unidentified  19     36.7
```

Figure 8-6xxx
Example of TO24HR periodic report

```
 >TO24HR  00:00-00:00   90/03/02   8640 SCANS

           IPS    WV-CCS   ANS   CW-CCS    AWT     BDH    %OCC

SYST     22308     5152    2.2     482    23.1   200.2    71
NCAMA    13715     4622    2.4     335    33.7
CAMA         0        0      0       0     0.0


TO2      14355     3376                   23.5   123.4    76


SYSTEM CALL TYPE
                     IPS       AWT
DA RCL               220      31.7
555                 8593       5.5
131                   56      37.1
555-HOM             5441      39.2
555-FOR             2383      33.9
411                 2945      28.9
INT-ANIF/ONI        1528      31.5
INT-CUT/SPL         1332      25.8
Combined/Unidentified  30     80.9


TO2 CALL TYPE
                     IPS       AWT
DA RCL               138      33.9
555                 5400       5.7
131                   32      50.0
555-HOM             3327      39.1
555-FOR             1546      34.5
411                 1892      29.9
INT-ANIF/ONI        1008      33.2
INT-CUT/SPL          161      26.9
Combined/Unidentified  19     36.7
```

Operator feedback system

The operator feedback system provides online individual operator feedback. A pair of software registers are provided in the DMS for each operator. Based on the operator logon identification number, one register accumulates the number of IPS or PS arriving at the operator's position. The second register gathers work volume usage for that operator. The registers are automatically initialized (reset to zero) at the start of each day.

Management personnel can request a printout of an individual operator's data by issuing commands at the TTY. The feedback consists of the operator's identification number, the date and time, the number of IPS or PS,

the AWT, and the system work time. The three TTY commands listed in Table 8-9 are used to administer the operator feedback system.

Table 8-9 Operator feedback system commands	
Command	**Purpose**
FD	Prints the feedback data for a specific operator
FI	Prevents an operator from zeroing out the feedback registers
FZ	Restores the operator's ability to zero out the feedback registers

FD command

The FD command allows management personnel to request feedback data on any operator in the office. After the command is issued, the system responds by printing out the operator number, the date and time, the operator's accumulated IPS or PS, AWT, and the system work time for the period from the start-of-day to the time the request is made.

Note: The appearance of the system AWT can be prevented from printing out by using the data modification order routing. Set the Table OFCV AR parameter TOPS_DISPLAY_AWT to N if the SYST information is not to appear on the operator position screen or on the printout.

Enter the following command at a SADS or TADS TTY:

>FD operator_number

For example:

>FD303

The TTY responds in the following way:

```
 OPR  #303  89/03/02   14:47
 IPS   601
 AWT   34.0
 SYST  35.0
```

Note: The appearance of the system AWT can be prevented from printing out by using the data modification order routing. Set OFCV AR parameter TOPS_DISPLAY_AWT to N if the SYST information is not to appear on the operator position screen or on the printout.

FI command

Using the FI command, management personnel can prevent operators from zeroing out their feedback registers from the operator position by denying them write access to these registers.

Enter the following command at a SADS or TADS TTY:

>FI operator_number

For example:

>FI303

The TTY responds in the following way:

```
F OK
```

An option is available though the DMO routine to prevent all operators from zeroing out their feedback registers. Set Table OFCVAR parameter TOPS-ZERO_FB_REG to N to prevent all operators from zeroing out their feedback registers.

FZ command

The FZ command allows management personnel to restore the ability to zero out feedback registers from the operator position. Enter the following command at a SADS or TADS TTY:

>FZ operator_number

For example:

>FZ303

The TTY responds in the following way:

```
F OK
```

Note: TOPS MPX does not allow operators to see their feedback on the operator position screen.

Operator study data system

The operator study data system collects productivity and efficiency data for up to 900 operators in an office at any given time and provides an enhancement to the operator feedback system. Study registers are used to

accumulate data for each assigned operator. The study registers are automatically initialized daily, at the system start-of-day. Data ceases to be accumulated when the operator leaves the position.

The operator study data system provides accumulated IPS, AWT, and SYST measurements, broken down into call type groups. A maximum of 15 call type groups can be assigned to study registers.

When the optional MFADS feature is implemented (the TOPS_PEG_MODE parameter in Table OFCENG set to IPS), the IPS and AWT fields of the TOTAL line are based on IPS only. However, if the optional enhanced MFADS feature is implemented by setting the TOPS_PEG_MODE to PS, the operator TOTAL statistics are modified to reflect total PS (IPS + TPS + RPS), rather than IPS-only totals.

Position seizure reports are identified by a PS column title in the report header instead of IPS. In these reports, the operator TOTAL (line 3) indicates total position seizures in the PS column and a PS-based AWT in the AWT column. All remaining call class (CALL TYPE) lines of these reports are unchanged.

For example, a PS extension produces a report like the following:

```
 STUDY   OPR 112 89/01/06   08:15

   CALL TYPE        PS    AWT    SYST
   TOTAL            499   30     27
   RECALLS          11    28     30
   CAMA             41    5      6
   OVERSEAS         7     22     40
   NCN-0MINUS       164   34     30
   CN-0MINUS        38    33     31
   NCN-0+           158   34     28
   CN-0-1+          58    23     32
   HOTEL            14    29     27
   COMBINED         8     27     51
```

The five TTY commands listed in Table 8-10 are used to administer the operator study data.

Table 8-10 Operator study data commands	
Command	**Purpose**
RA	Assigns an operator number to the operator study data system
RR	Releases the study register assigned to an operator number
RT	Applies to multitraffic office configurations only and is issued from a FADS. The RT command releases all of the study data registers assigned to a given traffic office.
RQ	Lists the operator numbers assigned to a study register. Also, at the FADS TTY, this command prints the number of study data registers assigned to each traffic office.
RD	Prints an operator's accumulated study data

Note: The operator feedback system applies only to general operator IDs.   It does not apply to the in-charge (IC) and service assistance (SA) positions.

RA command

The RA command is used to assign an operator number to the operator study data system. When the command is issued, the DMS immediately begins to accumulate study data (IPS and work volume by call type group) for the operator assigned and for the call types associated in Tables CLASSNAM and CLASSDEF.

Enter the following command at a SADS or TADS TTY:

>**RA operator_number**

For example:

>**RA243**

The TTY responds in the following way:

```
R OK
NO STUDY REG  (no study registers available)
```

The number of study registers available for assignment is defined by Table OFCENG parameter TOPS_NUM_STUDY_REG. If all study registers have been assigned and the RA command is entered at the TTY, the system

response is `NO ST REG`. This message is also displayed on the IC position screen when all registers have been assigned.

Parameter TOPS_DISPLAY_ST in Table OFCVAR can be activated to display `ST` on the operator position screen. This notifies the operator that the operator number has been assigned to a study register.

RR command

The RR command releases the study register assigned to an operator number. When the RR command is issued, the system releases the study register associated with the specified operator number and prints the study data accumulated up to that point. The printed data shows operator number, date, time, IPS, and AWT by call type for the operator and system AWT by call type for the period from the start of the day up to the time the command was entered.

When the RR command is issued, data ceases to be accumulated for the given operator number, and the study register becomes available for reassignment. To release a study register, enter the following command at a SADS or TADS TTY:

>RR operator_number

For example:

>RR333

The TTY responds in the following way:

```
     TO STUDY  OPR 333 89/03/02   23:02


     CALL TYPE         IPS    AWT       SYST
     RECALLS           543     34         27
     411                 0      0          0
     555-HOM            14     29         35
     555-FOR            55      9          6
     555-               13     43         45
     131               188     43         33
     141                30     48         29
     ***unidentified   193     31         28
     COMBINED           38     48         31
     DELAY               3     33         41
```

Note: The SYST column is printed only if the parameter TOPS_DISPLAY_AWT is set to Y (for *yes*) in Table OFCVAR.

RT command

The RT command releases all of the study registers assigned to a particular traffic office. This command applies to multitraffic office configurations only and is issued from the FADS TTY. Once the RT command is issued, all study registers assigned to the given office are immediately released and available for reassignment to another traffic office.

> *Note:* The RT command can be used to release study registers only in an office where no headsets are seated at any operator position. This command is normally used if a traffic office has been shut down. If the RT command is issued and headsets are seated, the system responds with a question mark and takes no action.

To release study registers associated with a traffic office, enter the following command at the FADS TTY:

>RT traffic_office_number

For example:

>RT5

The TTY responds in the following way:

```
RT 5 OK
```

RQ command

The RQ command lists all of the operator numbers assigned to a study register. When the RQ command is issued, the system responds by listing the total number of registers assigned in the traffic office, followed by the total number of study registers available for assignment (defined in parameter TOPS_NUM_STUDY_REG in Table OFCENG), and a list of the operator numbers that are assigned a study register.

To list all the operator numbers assigned to the operator study data system, enter the following command at the SADS or TADS TTY:

>RQ

The TTY responds in the following way (for example):

```
 TO 2        5/99

                 9
                77
               136
               796
              1555
```

In a multitraffic office, to list the number of operators assigned to the operator study data system in each traffic office, enter the following command at the FADS TTY:

> **>RQ**

The TTY responds in the following way (for example):

```
 SYST       5/99

            TO1   2
            TO2   1
            TO3   1
```

RD command

The RD command prints out an operator's accumulated study data, which includes operator number, date, time, operator IPS and AWT by call type, and system work volume for the period from the start of day to the time the command is issued. This command does not zero out the study data registers.

To see an operator's accumulated study data, enter the following command at the SADS or TADS TTY:

> **>RD operator_number**

For example:

> **>RD333**

The TTY responds in the following way:

```
 TO STUDY  OPR 333 89/03/02  23:36
   CALL TYPE      IPS   AWT    SYST
   TOTAL          488   30     27
   DELAY          0     0      0


   CALL TYPE          IPS    AWT          SYST
   RECALLS            543    34            27
   411                  0     0             0
   555-HOM             14    29            35
   555-FOR             55     9             6
   555-                13    43            45
   131                188    43            33
   141                 30    48            29
   ***unidentified    193    31            28
   COMBINED            38    48            31
   DELAY                3    33            41
```

Note: The SYST column is printed only if the parameter
TOPS_DISPLAY_AWT is set to Y (for *yes*) in Table OFCVAR.

Call transfer

The call transfer feature allows non-CAMA calls to be handled in two ways:

- transferred from one operator to another who is designated a transfer operator

- routed directly to a transfer operator based on call type or trunk group type

It also enables the system to provide separate statistics for different call types.

Call transfer capability is activated when the TOPS_TRANSFER_TYPES parameter is set to XFR1, XFR2, XFR DA, or all three. Once the call transfer capability is activated, it can be controlled from the SADS, TADS, or FADS TTY.

The five TTY commands listed in Table 8-11 are used to administer the call transfer feature.

Table 8-11
Call transfer commands

Command	Purpose
XA	Activates the call transfer feature (see notes)
XD	Deactivates the call transfer feature (see notes)
X...I	Specifies which operator can receive XFR calls and from which queue the operator will receive the XFR calls
X...X	Prevents an operator from receiving XFR calls in general or those from a specific XFR queue
X	Prints the number of operators in the office and the queues from which they can receive calls

Note 1: If parameter TOPS_TRANSFER_TYPES in Table OFCENG is set to NONE (no XFR type assigned), the SADS, TADS, or FADS TTY accepts no call transfer input commands.

Note 2: If parameter TOPS_TRANSFER_TYPES is set to XFR1, only the XFR1 queue can be activated using the XA1 command and deactivated using the XD1 command.

Note 3: If parameter TOPS_TRANSFER_TYPES is set to XFR1 XFR2, both XFR1 and XFR2 queues can be activated using the XA1 and XA2 commands or deactivated using the XD1 and XD2 commands.

Note 4: If parameter TOPS_TRANSFER_TYPES is set to XFR1 XFR2 DA, the XFR1, XFR2, and DA queues can be activated using the XA1, XA2, and XA3 commands or deactivated using the XD1, XD2, and XD3 commands.

Note 5: Although it is possible to set parameter TOPS_TRANSFER_TYPES to XFR2, allowing only the XFR2 queue to be activated, it is recommended to use XFR1 if only one XFR queue is required.

Note 6: Refer to *Office Parameters Reference Manual*, 297-1001-455, for additional information on parameter TOPS_TRANSFER_TYPES.

XA command

The XA command is used to activate the call transfer feature by queue.

- XA1 is used to activate the XFR1 queue.
- XA2 is used to activate the XFR2 queue.
- XA3 is used to activate the DA (XFR3) queue.
- XA1, 2, 3 can be used to activate all three queues.

The XA command is cumulative. If XA1 is entered, the XFR1 queue is activated. If XA2 is entered next, both transfer queues are activated, and the system response is XA1 2 ACT. One command does not overwrite the other.

To activate an XFR queue, enter the following command at a SADS or FADS TTY:

>**XA transfer_queue**

For example:

>**XA1**

The system responds in the following way:

```
  XFR 1 ACT
```

Note: The XA command is not available from the TADS TTY .

XD command

The XD command deactivates the call transfer feature by queue. If all XFR queues have been deactivated, the system response is XFR OFF; however, if XFR queues are still active, the system response to the XD command indicates which XFR queues are no longer active.

To deactivate a call transfer queue, enter the following command at a SADS or FADS TTY:

>**XD transfer_queue**

For example:

>**XD1**
>**XD2**
>**XD1, 2**

The TTY responds in the following way:

```
  XFR 1 OFF
  XFR 2 OFF
  XFR OFF              (transfer types 1 and 2 are not active)
```

Note 1: An XFR queue cannot be deactivated with the XD command if a reference to it exists in Table TOPS or Table XFROPSEL.

Note 2: If the XFR1 or XFR2 queue is not activated, calls cannot be transferred between operators in the same office.

Note 3: The XD command is not available from the TADS TTY .

X...I command

The operator profile is identified initially through data tables at the DMS. Once the operator profile is established, it can be changed from the TTY. Only transfer-related data can be changed from the TTY, using the X...I command and the X...X command in non-DA offices.

Issuing the X...I command overrides any previous transfer assignments made at the TTY and overwrites what is currently datafilled in Table OPRDAT, in field XFRSET, for the given operator number.

When the X...I command is issued, the system response contains the following information:

- the operator number
- all the call queues in the operator profile
- all the service types in the operator profile (applicable only if the DA package is present)

If the operator is logged on when the command is issued at the TTY, the message COMB: is displayed, followed by the operator's combined transfer profile (the calls the operator can receive at that specific position, based on both the operator's profile and the position profile).

The X...I command syntax requires that a service type be identified if the DA package is present in the office.

To change an operator's transfer profile, enter the following command at a SADS or TADS TTY:

> **>X operator_number I transfer_type service_type**

where:
transfer_type can be the following:
    0 = general queue
    1 = XFR1 queue
    2 = XFR2 queue
    3 = DA queue

and **service_type** can be the following:
    T = toll and assist
    D = directory assistance

For example:

>X104I1,2,3;T,D

The TTY responds in the following way:

```
OPR # 104 1 2 3  T D
```

Any reference to service type assumes that the DA package is present in the office. If the DA package is not present, the the service type option on the X...I command does not apply.

The operator profile must be compatible with the position profile. For example, an operator profile might specify GEN and XFR1, but the position profile might not include either of these queues in its profile, as the following example shows:

>X123I0, 1

The system responds in the following way:

```
OPR # 123 0 1 COMB:NONE
```

The command in this example specifies that operator number 123 can now receive calls from the GEN and the XFR1 queues. The operator, however, is logged onto a position that has neither the general nor the XFR queue in its profile, so there is no compatibility between the two. The operator can never receive GEN or XFR1 calls while logged on to that position. This is indicated by the COMB: NONE response from the system. The IC manager should instruct the operator to log off and then log on to another position that matches the operator's profile.

To direct the DMS to restore a specified transfer operator to normal call distribution mode, enter the following related command at a SADS or TADS TTY:

>X operator_number I0

For example:

> **X123I0**

The TTY responds in the following way:

```
  OPR # 123 0 1
  OPR # 123 0 1 COMB: 0 1
```

If the operator is logged on, the TTY response shows the combined transfer set of the position and the operator.

The X...I command can also be used to alter the service profile of the operator. The service profile must be compatible with the operator's transfer profile.

There are two variations on the X...I command:

- The service-only include form allows the manager to change the service profile of the operator without affecting the transfer profile
- The transfer-only include form allows the manager to change the transfer profile of the operator without affecting the service profile.

To change only the service profile of an operator, enter the following command at the SADS or TADS TTY:

>**X operator_number I service_type**

For example:

> **X104I;T,D**

The TTY responds in the following way:

```
  OPR # 104 0 3  T D
```

Note: An operator's service profile cannot be altered using the X...I command while the operator is logged on.

To change only the transfer profile of an operator, enter the following command at the SADS or TADS TTY:

>**X operator_number I transfer_type**

For example:

> **X104I 0,2**

The TTY responds in the following way:

```
OPR # 104 0 2  T D  COMB:  0 2 T
```

X...X command

The X...X command is used to exclude specified call queues from an operator's profile.

The system response to the X...X command indicates the operator number, all the call queues in the operator profile, and, if the operator is logged on, the calls the operator can receive at that specific position (based on both the operator profile and position profile datafilled in Table TOPSPOS).

To prevent calls in a given queue from being routed to a specified operator, enter the following command at the SADS or TADS TTY:

>X operator_number X transfer_type

where:
transfer_type can be any combination of the following:
   0 = GEN queue
   1 = XFR1 queue
   2 = XFR2 queue
   3 = DA queue

For example:

> X104X1

The TTY responds in the following way:

```
OPR # 104 0 2
```

In this example, operator 104 will receive calls from the GEN queue only.

Note: The X...X command is not available in offices with DA service.

X command

The X command prints the operator numbers of all operators (logged on and not logged on) and the queues from which they can receive calls. The printout covers not only transfer operators, but all operators in the traffic office.

To query the number of operators and the queues from which they can receive calls, enter the following command at the SADS or TADS TTY:

>X

The TTY responds in the following way (for example):

```
   XFR OPR

   OPR        107   0     1       2
   OPR   *    112   0     1
   OPR        117   0     2
   OPR        125   0     2
```

The asterisk (*) in this sample response indicates transfer operators assigned but not logged on. If DA service is not provided in the office, the services (SVC) column does not show up on the response.

Controlled traffic

The IC manager can place an operator in controlled traffic mode using the T...I and T...X TTY commands and can query the number of operators in controlled traffic mode using the T command. These three commands are defined in Table 8-12.

**Table 8-12
Controlled traffic commands**

Command	Purpose
T...I	Allows the IC manager to specify which call type groups may access a given operator
T...X	Allows the IC manager to specify which call type groups may not access a given operator
T	Queries the number of operators in controlled traffic mode in the office

Being in controlled traffic mode allows an operator to receive only specified types of calls. This capability is useful when training new operators to ensure that they receive only call types they have been trained to handle.

A maximum of 15 call type groups can be assigned. These are defined in Table CLASSNAM.

Note: The call types assigned in Table CLASSNAM are the same as the ones printed in the 6HR and 24HR periodic reports and in the operator study data reports.

The T...I and T...X commands are not cumulative. The DMS always assumes that 15 call types are included or excluded with each command. The previous command has no effect on the command being entered. For example, the IC manager might place operator 111 in controlled traffic mode and route only call types 1, 2, and 3 to that operator. Then if the manager enters the command to include call types 4, 5, and 6, operator 111 receives only call types 4, 5, and 6. Call types 1, 2, and 3 are no longer included, because the last command entered for operator 111 assigned only call types 4, 5, and 6 out of the possible 15.

Up to 15 call types can be included or excluded using these input commands. The DMS allows 15 call types to be assigned at the TTY, even when fewer are assigned in Table CLASSNAM. Only the call types assigned in Table CLASSNAM and also entered at the TTY are actually included. For example, if nine call types are assigned in Table CLASSNAM and the input command entered at the TTY includes call types 1 through 10, only call types 1 through 9 are assigned, even though the system allows the user to enter 10 at the TTY.

The same principle applies to the exclude command. The DMS allows up to 15 call types to be excluded, but the only call types actually assigned to an operator are those assigned in Table CLASSNAM and are not excluded using the exclude command.

T...I and T...X commands

The T...I command allows the IC manager to specify the call types a particular operator will receive. This places the operator in controlled traffic mode.

To *include* specific call types in the controlled traffic set of a particular operator, enter the following command at the SADS or TADS TTY:

>**T operator_number I call_group_types**

For example, the following command includes call types 1, 2, and 3 in the controlled traffic set of operator #105:

>**T105I1, 2, 3**

The TTY responds in the following way:

```
OPR # 105 1 2 3
```

To *exclude* specific call types from the controlled traffic set of a particular operator, enter the following command at the SADS or TADS TTY:

>T operator_number X call_group_types

For example, the following command excludes call types 12, 13, 14, and 15 from the controlled traffic set of operator #222:

>**T222X12, 13, 14, 15**

The TTY responds in the following way:

```
OPR # 222 1 2 3 4 5 6 7 8 9 10 11
```

The system response to a controlled traffic input command lists the call types group numbers that are included for the specified operator. This applies to both T...I and T...X commands.

Including (I) zero (0) call types cancels controlled traffic mode. To remove an operator from controlled traffic mode, enter the following command at the SADS or TADS TTY:

>T operator_number I0

For example:

>T222I0

The TTY responds in the following way:

```
OPR # 222 ALL
```

T command

The T command requests a list of the operators currently in controlled traffic mode.

To request a list of the operators in controlled traffic mode, enter the following command at a SADS or TADS TTY:

>T

The TTY responds in the following way (for example):

```
    CT OPR

    OPR      107   7      9    11
    OPR   *  111   1      5
    OPR      120   8      9    13
    OPR      126   5      6     8      9       10
    OPR   *  129   6      9    11     14

```

The system response includes the operator numbers and the call type groups from which each operator will receive calls. An asterisk (*) on the output indicates that an operator is in controlled traffic mode but not logged on.

Position control

The IC or SA positions can be removed and returned to service using the two TTY commands defined in Table 8-13.

Table 8-13
Position control TTY commands

Command	Purpose
O	Removes an IC or SA position from service
I	Returns an IC or SA position to service

O command

To remove an IC or SA position from service, enter the following command at the SADS or TADS TTY:

>**O position_number**

For example:

>**0121**

The TTY responds in the following way:

```
    POS # 121 OFF ASST
```

I command

To return an IC or SA position to service, enter the following command at the SADS or TADS TTY:

> **>I position_number**

For example:

> **>I121**

The TTY responds in the following way:

```
POS # 121 ON ASST
```

Call distribution

A primary function of TOPS MPX is to assign each call to an available operator. Incoming calls are generally placed in queue and distributed to idle and occupied positions on a first-in, first-out (FIFO) basis. Initial calls are placed at the bottom of the calls-waiting (CW) queue until they are passed to an available operator. These calls are connected to operator positions in the order in which they were received.

Recalls, calls that reaccess an operator position, are placed at the top of the CW queue, and are handled before any other calls in the queue. When a TOPS MPX position becomes available, the DMS searches the CW queue and connects the calls at the top of the queue to the idle position in the following order:

- recalls (oldest recall first)
- initial calls (oldest call first)

Three features affect call distribution:

- Assignable grade of service allows the operator company to assign an aging parameter to queues, allowing some queues to have higher priority than others.
- Controlled traffic allows specified operators to receive specified call types. This feature is used mainly as a training tool.
- Call transfer allows calls to be transferred from one operator to another, or to be routed directly to a transfer operator based on call type or trunk group type.

The separation of TOPS MPX positions into two or more traffic offices, which may be at different locations, does not affect the distribution of calls.

When more calls arrive than there are operators to handle them, calls are placed in the CW queue. There is a limit to the number of calls allowed to go into the CW queue. Changes in the number of occupied positions or in the value of the AWT cause changes in operator capacity. As the operator capacity changes, the number of calls that can be placed in the queue but

still be serviced within a specified amount of time changes. To accommodate fluctuating operator capacity, six data tables are used to limit queue size. Each table specifies queue thresholds for a particular average work time (AWT) and covers the entire range of occupied position quantities. The values in these six tables determine when the CW display appears and when calls start being deflected.

The DMS dynamically selects the table that comes closest to the conditions in the office, based on system AWT for the previous 15 minutes and on the number of occupied positions.

The automatic selection can be manually overridden using TTY commands. The four commands associated with call distribution are defined in Table 8-14.

Table 8-14
Call distribution commands

Command	Purpose
AM	Instructs the DMS to immediately start referencing the sixth queue threshold table
AX	Instructs the DMS to immediately start referencing the specified queue threshold table for the specified active XFR type
AD	Restores dynamic selection of the queue threshold table
AQ	Requests an indication of the queue threshold table currently being referenced by the DMS

AM command

The AM command eliminates dynamic selection and forces the DMS to refer only to the sixth QT table (QT5) for all active XFR types. This procedure is activated only under periods of severe service degradation and only with appropriate authorization.

To eliminate dynamic selection, enter the following command at the SADS or FADS TTY:

   >AM

The TTY responds in the following way (for example):

```
                #       AWT
                0       020
                1       025
                2       030
                3       035
                4       040
                5       050

    XFR      QTABLE     SEL

     0         5         M
     1         5         M
     2         0         D
```

Note: The D or M abbreviation in the SEL column indicates whether the selection is manual (M) or dynamic (D).

AX command

The AX command allows manual selection of any queue threshold table for any transfer type. It instructs the DMS to immediately start referencing the specified queue threshold table for the specified active XFR type.

To select a queue threshold table for a specific active XFR type, enter the following command at a SADS or FADS TTY:

>**AX active_transfer_type QT queue_threshold_table**

where:
active_transfer_type:
    0 = GEN queue
    1 = XFR1 queue
    2 = XFR2 queue
    3 = DA queue
queue_threshold_table:
    0 - 5

For example:

>AX1QT4

The TTY responds in the following way:

```
              #      AWT
              0      020
              1      025
              2      030
              3      035
              4      040
              5      100


  XFR      QTABLE    SEL

   0         3        D
   1         4        M
   2         0        D
```

Note: The D or M abbreviation in the SEL column indicates whether the
selection is manual (M) or dynamic (D).

AD command

The AD command restores dynamic selection of the queue threshold tables.
Note that only active XFR types can be specified.

To restore dynamic selection of threshold tables for a specified XFR type,
enter the following command at a SADS or FADS TTY:

>AD transfer_queue

where **transfer_queue:**
   0 = GEN queue
   1 = XFR1 queue
   2 = XFR2 queue
   3 = DA queue

For example:

> AD2

The TTY responds in the following way:

```
             #       AWT
             0       020
             1       025
             2       030
             3       035
             4       040
             5       100


XFR      QTABLE    SEL

 0         5        M
 1         5        M
 2         0        D
```

Note: The D or M abbreviation in the SEL column indicates whether the selection is manual (M) or dynamic (D).

Entering the AD command without parameters restores all queues under manual selection control to dynamic selection.

To restore all queues to dynamic selection, enter the following command:

   >AD

The TTY responds in the following way (for example):

```
             #       AWT
             0       020
             1       025
             2       030
             3       035
             4       040
             5       050


  XFR      QTABLE    SEL

   0         3        D
   1         1        D
   2         0        D
```

Note: The D or M abbreviation in the SEL column indicates whether the selection is manual (M) or dynamic (D).

AQ command

The IC manager can use the AQ command to query the DMS about which AWT has been dynamically selected for each transfer type, in order to determine which QT table the DMS is using. The system responds by listing

- the six tables and the AWT associated with each
- the specific table associated with each active XFR type
- whether the QT table was selected manually or dynamically

To query the DMS about which AWT has been selected for each XFR type, enter the following command at a SADS or FADS TTY:

>AQ

The TTY responds in the following way (for example):

```
            #        AWT
            0        020
            1        025
            2        030
            3        035
            4        040
            5        050


    XFR     QTABLE   SEL

     0        3       D
     1        1       D
     2        0       D
```

Note: The D or M abbreviation in the SEL column indicates whether the selection is manual (M) or dynamic (D).

Silence Sonalert tone

Entering the S command at the FADS TTY silences the Sonalert at the FM CRT position.

S command

To silence the Sonalert tone at the FMCRT, enter the following command at the FADS TTY:

>S

Do not press **RETURN**. The TTY responds in the following way:

```
   >
```

Position information

Entering the O command generated a list of the IC or SA positions that have been removed from service.

O command

To generate a list of the IC or SA positions (or both) removed from service, enter the following command at the SADS or TADS TTY:

> **>O**

The TTY responds in the following way:

```
   OS         POS
   POS     #102 OFF IC
   POS     #121 OFF ASST
```

Information on operators

Two commands are used to solicit information from the DMS:

- L - prints a listing of all operators (including service assistants) currently logged on
- P - prints a listing of the status of all TOPS MPX positions

L command

The L command creates a listing of all operators currently logged on. The system lists the operators' numbers (OPR), the positions they are logged on to (POS), their combined transfer profiles (XFR) if the call transfer feature is active, and their combined service profiles if DA is active. If DA is not active, the combined service (COMBSVC) field does not appear on the report. The COMBSVC field indicates that the operator and the position both have the combined capability to perform toll and assist (T) and directory assistance (D).

Note 1: Activating the call transfer feature modifies the format of the system's response to the L command, indicating the queues from which logged-on operators can receive calls (0 = GEN queue, 1 = XFR1 queue, 2 = XFR2 queue, and 3 = XFR DA queue).

Note 2: For a logged-on operator, the combined transfer profile is determined by comparing the operator's transfer capability profile (from Table OPRDA T) with the position's transfer set (from Table TOPSPOS). If a transfer type is

listed in both the operator's and the position's profile, the operator can receive calls from that transfer queue. In that case, the transfer type also appears in the combined transfer profile for the operator and the position.

To create a listing of operators currently logged on, enter the following command at a SADS or TADS TTY:

>L

The TTY responds in the following way (for example):

```
 OPR     POS      COMBXFR
  73     107        0
  11     112        0
 101     114        0
 127     143        0
```

With XFR 1 and 2, the TTY responds in the following way (for example):

```
 OPR     POS      COMBXFR
  73     107        0
  11     112        0   1   2
 101     114        0
 127     143        0   1
```

With XFR 1 and 2 and DA, the TTY responds in the following way (for example):

```
 OPR     POS      COMBXFR        COMBSVC
  73     107        0              T
  11     112        0 1 2 3        T D
 101     114        1 2 3          T D
 127     143        3              D
```

P command

The P command lists the current status of the TOPS MPX positions. The system response lists the number of positions in each condition. The overall system status is printed as well as the individual traffic office statistics for the status displays shown in Table 8-15.

Table 8-15
TOPS MPX status displays

Display	Definition
OC	Occupied positions (headset seated), excluding those in training or maintenance mode
MB	Occupied positions in one of the following states: - when the operator has seated the headset but has not completed the logon procedure - when the operator has pressed the **Make Busy** key but is still occupied with a call - when the operator has pressed the **Make Busy** key and is initiating a call (for example, a subsequent attempt or a call to the SA position), or is performing some other necessary activity
OD	Occupied or unoccupied positions out of order, for any of the following reasons: - entering a maintenance command at a TTY - entering a maintenance command at the MAP - entering a maintenance command at the TAMI
CT	Positions occupied by operators in controlled traffic mode
UCP	Unoccupied positions with a call in progress (that is, held on loop)
UCD	Unoccupied positions on which the call in progress (see UCP) has terminated (been disconnected)
ACS	Positions that have a loop accessed but at which neither the calling nor the called party is attached and off-hook

Note: Activating the call transfer feature causes the P command to include OC and MB data for XFR1, XFR2, and XFR DA type operators, or a combination of these.

To print a report on the current status of the TOPS MPX positions, enter the following command at the SADS or FADS TTY:

>P

The TTY responds in the following way (for example):

```
                          TOPS POS


              OC     MB    OD    CT    UCP   UCD   ACS


      SYST    9      5     1     1     2     1     1

      TO1     2      1     1     0     0     0     1
      TO2     1      1     0     1     0     0     0
      TO3     2      0     0     0     1     0     0
      TO4     1      2     0     0     1     1     0
      TO5     3      1     0     0     1     1     0
```

Activating the call transfer feature modifies the format of the system response to the P command to include OC and MB data for XFR1 and XFR2 operators.

To modify the system response to include OC and MB data for XFR1 and XFR2 operators, enter the following command:

   >P

The TTY responds in the following way (for example):

```
                          TOPS POS


        OC    MB    OD    CT    UCP   UCD   ACS   OC1   MB1   OC2   MB2


  SYST  9     5     1     1     2     1     1     6     4     3     1

  TO1   2     1     1     0     0     0     1     2     0     0     0
  TO2   1     1     0     1     0     0     0     0     1     1     0
  TO3   2     0     0     0     1     0     0     1     0     1     1
  TO4   1     2     0     0     1     1     0     1     2     0     0
  TO5   3     1     0     0     1     1     0     2     1     1     0
```

QMS TTY commands, queries, and reports

This chapter describes the commands and queries entered at the QMS force administration data system (QFADS), and QMS traffic office administration data system (QTADS) teletypewriters (TTYs), as well as the reports generated by these TTYs. The TTYs referred to in this chapter are defined in Chapter 2, "Work force office configurations."

The TTY commands, queries, and reports described in this chapter apply to the Queue Management System (QMS). Chapter 8, "ACD TTY commands, queries, and reports," describes the commands, queries, and reports used in the automatic call distribution (ACD) environment.

The commands, queries, and reports discussed in this chapter are grouped according to their functions as follows:

- force management (FM) and traffic office (TO) periodic reports
- operator feedback system
- operator study data system
- position control
- information on operators
- silence Sonalert tone
- report QMS call queue conditions

Table 9-1 lists the commands discussed in this chapter and identifies the section where they are described.

Table 9-1
Subsection to commands, queries, and reports cross-reference

Subsection	Command/query/report
QMS reports	QTADS report, QFADS report
Operator feedback system	FD, FI, FZ
Operator study data system	RA, RR, RQ, RD, RT
Position control	O, I
Information on operators	L, P
Silence Sonalert tone	S
Report QMS call queue conditions	CD, CW, CQ

In many cases, commands and queries are not available on a particular TTY type. A command may be available at a QFADS TTY, for example, but not at a QTADS TTY. Such restrictions are indicated in the command description. These restrictions are based on the office configuration in use. In addition, Table 9-2 provides a list of the TTY devices and the commands they accept.

Table 9-2
Device to command cross-reference

Device	Commands it accepts
QTADS	FD, FI, FZ, RA, RR, RQ, RD, B, BX, BE, O, I, WP, WI, WD, WA, L, P, CW, CD, CQ
QFADS	RT, B, BX, BE, WP, WR, S, CW, CD, CQ

In this chapter, an input prompt (>) indicates that the subsequent information is a command. Capital letters represent commands, fixed parameters, and responses from the TTY. Enter the command or fixed parameter exactly as it appears on the page. Lowercase letters represent variables. For commands and parameters, enter the letters or numbers that the variable represents. At the TTY, type in the command and press the **RETURN** key. All commands and queries entered at the TTY *must* be followed by a carriage return.

When any part of a command is not accepted by the system, a question mark (?) is printed at the TTY on which the command was issued, and no action is taken.

QMS reports

TOPS QMS generates force management reports that are printed at the QMS FADS (QFADS) and QMS TADS (QTADS) devices. The QFADS report pegs data on traffic offices, queues, services, and call classes. The QTADS report pegs data on queues, services, and call classes. The QFADS report (except for traffic office data) prints data that is summed over all traffic offices. The QTADS report prints only data accumulated by operators in the team to which that QTADS device belongs.

QMS has the potential to print up to 255 queue records, if used with an external vendor's MIS report package. The system limits the number of service records printed to 16.

> *Note:* The QMS basic statistics package allows reporting on the first 32 queues only.

The actual number of queue records printed in both the QFADS and QTADS reports equals the value of the office parameter QMSFM_NUM_QUEUES. The actual number of service records printed in both the QFADS and QTADS reports equals the value of the office parameter QMSFM_NUM_SERVICES.

QFADS and QTADS reports are generated automatically every 15 minutes. No 6-hour or 24-hour summary QFADS or QTADS reports are available. QFADS and QTADS reports should print within 15 minutes. If a report requires too much time, the QFADS or QTADS prints a message. Receiving this message indicates that the number of queues needs to be reduced.

Character counts

Table 9-3 specifies the number of characters contained in each part of the QFADS and QTADS reports.

Table 9-3	
QFADS and QTADS report character counts	
Report section	**Number of characters**
Traffic office report heading	73
Traffic office record	73
By-system queue report heading	59
By-system queue record (containing CW and ANS)	59
Service report heading	31
Service record	31
FM call class report heading	49
FM call class record	49

The QFADS printed report

Figure 9-1 shows an example of a QFADS report. All time measurements are reported in seconds.

The QTADS printed report

The QTADS TTY prints statistics compiled over the last 15-minute report period by operators in the team to which that QTADS device belongs.

The QTADS report sorts data by three categories: QMS queue, QMS service, and QMS force management call class. It also prints out one line of system totals and one line of team totals for initial position seizures (IPS), recall position seizures (RPS), total position seizures (TPS), call busy work volume (CBWV), non-call work volume (NCWV), idle time (IDLT), average occupied positions (AOP), and percent occupancy (%OCC).

System totals are printed for each QMS call queue, QMS service, and QMS force management call class included in the QTADS reports. System totals are printed directly above the traffic office totals.

Figures 9-2 and 9-3 show parts 1 and 2 of a sample QTADS report. All time measurements are reported in seconds.

Figure 9-1xxx
Sample QFADS report

```
12:34:56

QMS TEAMS

         IPS    RPS    TPS    CBWV    NCWV    IDLT    AWT    AOP    %OCC
SYST     618    224     80   19695    1700    2200   21.4   26.2     90

TO 1     310     68      4   10782     800    1400   28.2   14.4     89
TO 2     178     44     40    4256     600     500   16.2    6.0     91
TO 3     130    100     36    4657     300     300   17.5    5.8     94


QMS QUEUES

         IPS    RPS    TPS    CBWV     AWT     CW    ANS
CQ4      160    112     40   11509    13.6    265    0.8
CQ5       40      0     20    2400    20.0     39    0.7
CQ6      234     50      0    1223    10.8    355    1.2
CQ7      126     46     18    2689    15.2    190    1.0
CQ8       58     16      2    1874    24.8     23    0.3



QMS SERVICES

          SI    SWV    SAWT
SRV 0    463   7037    15.2
SRV 1    318   6868    21.6
SRV 2    306   5791    18.9


QMS CALL CLASSES

              IPS    RPS    TPS    CBWV     AWT
UNDEFINED       0      0      0       0     0.0
DELAY          76      0      0     605     8.0
COIN_RECALL     0    112      0    1589    14.1
DA_RECALL       0    112      0    1952    17.4
CAMA           40      0      0     200     5.0
OVERSEAS       14      0     10    2000    83.3
NCN-0MINUS    138      0     44    4256    23.4
CN-0-1PLUS     58      0      4    1362    22.0
NCN-0PLUS     144      0     12    3562    22.8
CN-0MINUS      90      0     10    3162    31.6
INWARDS        44      0      0     367     8.3
DA             70      0      0     640     9.1
```

Figure 9-2xxx
Sample QTADS report, part 1

```
 09:45:23

 QMS TEAMS

          IPS    RPS    TPS    CBWV    NCWV    IDLT    AWT    AOP   %OCC
 SYST     618    224     80   19695    1700    2200   21.4   26.2    90

 TO 1     310     68      4   10782     800    1400   28.2   14.4    89


 QMS QUEUES

          IPS    RPS    TPS    CBWV    AWT     CW    ANS
 CQ4      160    112     40   11509   13.6    265    0.8
 CQ5       40      0     20    2400   20.0     39    0.7
 CQ6      234     50      0    1223   10.8    355    1.2
 CQ7      126     46     18    2689   15.2    190    1.0
 CQ8       58     16      2    1874   24.8     23    0.3


 TO1 QUEUES

          IPS    RPS    TPS    CBWV    AWT
 CQ4      156      0      4    4219   26.3
 CQ5       40      0      0    1398   34.9
 CQ6      114      1      0    2238   19.4
 CQ7        0     46      0     629   13.7
 CQ8        0     16      0     394   24.6


 QMS SERVICES

           SI    SWV   SAWT
 SRV 0     463   7037   15.2
 SRV 1     318   6868   21.6
 SRV 2     306   5791   18.9


 TO1 SERVICES

           SI    SWV   SAWT
 SRV 0     120   3490   29.1
 SRV 1     276   7292   24.6
 SRV 2       0      0    0.0
```

Figure 9-3xxx
Sample QTADS report, part 2

```
QMS CALL CLASSES

              IPS      RPS      TPS     CBWV      AWT
UNDEFINED      0        0        0        0       0.0
DELAY         76        0        0       605      8.0
COIN_RECALL    0       112       0      1589     14.1
DA_RECALL      0       112       0      1952     17.4
CAMA          40        0        0       200      5.0
OVERSEAS      14        0       10      2000     83.3
NCN-0MINUS   138        0       44      4256     23.4
CN-0-1PLUS    58        0        4      1362     22.0
NCN-0PLUS    144        0       12      3562     22.8
CN-0MINUS     90        0       10      3162     31.6
INWARDS       44        0        0       367      8.3
DA            70        0        0       640      9.1


TO1 CALL CLASSES

              IPS      RPS      TPS     CBWV      AWT
UNDEFINED      0        0        0        0       0.0
DELAY         20        0        0       257     12.8
COIN_RECALL    0       40        0       689     17.2
DA_RECALL      0        0        0        0       0.0
CAMA          24        0        0       101      4.2
OVERSEAS      14        0       10      2000     66.7
NCN-0MINUS    54        0       22      1857     24.4
CN-0-1PLUS    34        0        4       765     20.1
NCN-0PLUS    102        0        6      2361     21.9
CN-0MINUS     68        0        6      2248     30.4
INWARDS       26        0        0       207      8.0
DA            38        0        0       297      7.8
```

Interactions with FADS reports

Printed office-wide reports are provided for TOPS ACD offices by a FADS device. Since TOPS ACD and QMS ACD may coexist within the same office, FADS and QFADS devices may exist within the same office.

A FADS report prints records for all traffic offices specified by the TOPS_NUM_TRAFFIC_OFFICES parameter, regardless of whether the traffic office is entirely QMS ACD or TOPS ACD. However, all traffic office records printed for an office datafilled as QMS in Table TEAMACD will have all fields set to 0. Records for QMS traffic offices should be discarded when printed from a FADS device.

QMS MIS interface

Basic QMS force management devices, report formats, and data are fixed for all offices. A TOPS office can customize its force management system, however, through the optional QMS management information system (MIS) interface and an external vendor's force management software. For example, an office might use the QMS MIS interface to generate graphical instead of numerical reports, to generate reports on a flexible basis instead of every half hour or 15 minutes, or to create new types of force management devices.

Real-time and periodic reports are calculated from the same set of base queue and operator events. With the QMS MIS interface, however, the DMS gives an external vendor the appropriate information about these base events, continuously and within a few seconds of the event. The external vendor can then choose, based on the event information, which real-time statistics and periodic reports to generate.

This feature sends queue and position event information to an outside device through a high-speed datalink within a datafillable time after the event occurs. The external device then decides what real-time calculations to make, what data to use for periodic reports, what kind of output devices will receive real-time and periodic reports, and how these reports will be formatted and displayed. In effect, the external device controls the display and collation of force management data. The DMS offloads to the outside MIS the responsibility for calculating and maintaining reports and statistics, outputting to various devices, and formatting and displaying reports. It only provides the event information that the MIS needs to generate reports.

Sending event messages adds a number of benefits for force management monitoring. With this process, the external MIS system can break down information to a finer level of detail. For example, the MIS can monitor

- individual operators over a wide range of detailed criteria, including average work time (AWT) per force management call type or operator

- the performance, in detail, of each individual queue, including the AWT of calls from the queue, the average answer time of calls in the queue, and the number of calls in queue at any one time

- the performance of detailed call types

    Note: With non-QMS TOPS ACD, the finest force management call type granularity offered by the force management system is 15 call classes made of force management call type groups. With TOPS QMS, the operating company can specify up to 2047 force management call types.

- the disposition of calls released from an operator (whether, for example, a call was transferred to DA ARU announcement, to automated alternate billing service, or to some other feature)

- the billing class of calls serviced by an operator

The MIS can also produce reports on the traffic originating from a certain geographical area, based on incoming trunk group.

QMS MIS, together with the call queue assignment processing feature, allows the MIS to provide statistics for each new possible service provided by TOPS solely by changing datafill. (With non-QMS TOPS ACD, each new service may require enhancements in the DMS software to provide effective force management capabilities.

QMS MIS requires no changes to DMS software to quickly manipulate data into any kind of format, report, graph, or chart.

With this feature, the operating company can implement a wide variety of display terminals, printers, and computers that may collect and display data with minimal DMS interaction. For instance, a TOPS office might implement separate devices for reporting on operators, queues, teams, and services, without new development on the DMS side.

QMS TTY commands

Through commands typed at QFADS and QTADS devices, QMS provides the following capabilities:

- operator feedback
- operator study registers
- removing and returning service assistance (SA) and in-charge (IC) positions from and to service
- printing a real-time list of logged-on operators
- printing a report of current TOPS QMS position status
- silencing the Sonalert tone
- reporting on QMS call queue conditions

All of these capabilities, except for queue condition reporting, are also available with TOPS ACD FADS and TADS devices. However, commands used at QFADS and QTADS devices affect only QMS positions, operators, and services, while commands used at FADS and TADS devices affect only TOPS ACD positions, operators, and services.

Similarly, QMS and ACD have analogous office parameters for functions such as displaying system AWT and zeroing feedback registers. However, the QMS parameters operate only on QMS offices or operators, and the corresponding TOPS ACD parameters operate only on TOPS offices or operators.

Note that the call distribution commands of the ACD system (AM, AX, AD, and AQ) do not apply in QMS. QMS call distribution is controlled by

datafilling the tables described in Chapter 3, "Understanding how the DMS distributes calls." Refer to the section "TOPS call queue assignment with QMS" on page 3-12 for details.

Operator feedback

TOPS QMS has a system of online individual operator feedback that provides the raw total of the number of position seizures and the AWT of any operator. Two software registers are provided internally for each operator. One register pegs the number of position seizures (PS) accumulated by the operator. The other register pegs the amount of CBWV generated by each operator. This differs from TOPS ACD in its use of IPS and total work volume (WV).

TOPS MPX does not allow operators to display their accumulated PS and AWT (calculated from their accumulated CBWV) at their terminals. They may, however, print that information at the QTADS.

Note: Parameter QMSFM_BASIC in Table TQMSOPT enables or disables the collection and reporting of TOPS QMS basic statistics. When this parameter is set to N, the DMS does not generate reports at QMFADS, QFADS, or QTADS devices, or update real-time QMS information on the FMCRT, IC, or SA positions. Operator feedback statistics are frozen. L, P , F, R, and C commands are disabled. Setting QMSFM_BASIC to N saves CPU time that would have been spent collecting, collating, and reporting system data. When QMSFM_BASIC is set to Y (the default), the DMS generates real-time displays and reports and enables QMS force management commands.

Through a series of commands entered at the QTADS device, the traffic office manager may print the results of operator feedback data and allow the operator to zero the content of the registers.

In addition, the system AWT may be displayed and printed along with the operator statistics if the parameter QMSFM_DISPLAY_AWT in Table TQMSOPT is set to Y.

Note: The system AWT for both display and print is the system AWT for the prior 15-minute reporting period, because system statistics for QMS are not accumulated throughout the day as they are for TOPS ACD. Thus, while this approach to QMS feedback register administration is identical to the equivalent TADS and TOPS ACD operator feedback system functionality, the values displayed for operator and system statistics are different because of different measurement methods.

The three TTY commands listed in Table 9-4 are used to administer the operator feedback system.

Table 9-4xxx
QMS operator feedback system commands

Command	Purpose
FD	Prints the feedback data for a specific operator
FI	Prevents an operator from zeroing out the feedback registers
FZ	Restores the operator's ability to zero out the feedback registers

FD command

Operator feedback data may be printed by entering the FD command, along with an operator number, at a QTADS device. The system responds by printing the operator number, the date and time, the operator's number of position seizures, and the operator's AWT. The AWT is calculated from the number of position seizures and the amount of CBWV accumulated by the operator and stored by the DMS.

The display of the system AWT is controlled by parameter QMSFM_DISPLAY_AWT in Table TQMSOPT. This is the AWT from the prior 15-minute reporting period. Printed operator and system AWT are provided to an extra decimal point of accuracy over that displayed at an operator's terminal, where the values are rounded.

Enter the following command at a QTADS TTY:

>**FD operator_number**

For example:

>**FD319**

The TTY responds in the following way:

```
OPR # 319 91/10/24 14:37

PS    672
AWT   27.8
SYS   28.3
```

FZ command

The team administrator can enable or disable the option of allowing individual operators to zero their own feedback registers. The FZ command enables the option, thus allowing operators to zero feedback registers from the operator position.

Enter the following command at a QTADS TTY:

>**FZ operator_number**

For example:

>**FZ272**

The TTY responds in the following way:

```
F OK
```

FI command

The FI command disables the option, thus inhibiting operators from zeroing feedback registers from the operator position.

Enter the following command at a QTADS TTY:

>**FI operator_number**

For example:

>**FI272**

The TTY responds in the following way:

```
F OK
```

If parameter QMSFM_ZERO_FB_REG in Table TQMSOPT is set to N, zeroing of all QMS operator registers is disabled, as are the FI and FZ QTADS commands.

Operator study registers

The operator study register system collects data on the total number of position seizures and amount of work volume generated by an operator, segregated by the QMS FM call classes found in Table TQCLSNAM. Unlike feedback registers, study registers are not automatically allocated to each operator. Study registers are assigned to operators through a command at the QTADS device. In addition to the 900 study registers available for ACD, the DMS can allocate up to 450 QMS study registers. The number of QMS study registers allocated is determined by the office parameter QMSFM_NUM_STUDY_REG in Table OFCENG.

The TTY commands in Table 9-5 are used to administer operator study data.

Table 9-5xxx QMS operator study data commands	
Command	**Purpose**
RA	Assigns an operator number to the operator study data system
RR	Releases the study register assigned to an operator number
RT	Releases all study data registers assigned to a given traffic office
RQ	Lists the operator numbers assigned to a study register. Also, at the FADS TTY, this command prints the number of study data registers assigned to each traffic office.
RD	Prints an operator's accumulated study data

Note: The operator feedback system applies only to general operator IDs. It does not apply to the SA or IC positions.

RA command

The RA command is used to assign an operator number to the operator study data system.

Enter the following command at a QTADS TTY:

>RA operator_number

For example:

>RA229

The TTY responds in the following way:

```
R OK
```

The DMS begins accumulating study data for operator 299.

The characters ST are displayed at the operator's terminal unless the parameter QMSFM_DISPLAY_ST in Table TQMSOPT is set to N. If no study registers are available to assign to the operator, the system response is NO STUDY REG.

RR command

The RR command releases the study register assigned to an operator number. When the RR command is issued, the system releases the study

register associated with the specified operator number and prints the study data accumulated up to that point. The printed data shows operator number, the date and time, and a breakdown of the number of position seizures and AWT by QMS FM call class. The system also totals position seizures and averages AWTs over all QMS FM call classes.

When the RR command is issued, data ceases to be accumulated for the given operator number, and the study register becomes available for reassignment. To release a study register, enter the following command at a QTADS TTY:

>**RR operator_number**

For example:

>**RR333**

The TTY responds in the following way:

```
    TO STUDY OPR 333 91/10/17 15:09


QMS CALL CLASS    PS      AWT    SYST
TOTAL             698     40.0   39.5


UNDEFINED           0      0.0    0.0
DELAY               0      0.0    0.0
DA RECALLS         23     19.3   20.4
COIN RECALLS       28     42.5   45.5
CAMA               55      9.1    8.7
NCN-0MINUS        160     48.3   44.6
NCN-0PLUS         234     38.2   38.2
CN-0MINUS          38     56.8   58.3
CN-OPLUS           45     49.4   47.2
CN-1PLUS           92     45.7   46.3
HOTEL              23     22.4   23.9
```

Note: The system AWT is printed only if the parameter QMSFM_DISPLAY_AWT in Table TQMSOPT is set to Y. The system AWT values are those for the prior 15-minute reporting period. This differs from TOPS ACD system AWT displays, which are accumulated over the day.

RT command

The RT command releases all of the study registers assigned to a particular QMS traffic office. Once the RT command is issued, all study registers assigned to the given office are immediately released and available for reassignment to another traffic office.

Note: The RT command can be used to release study registers only in a QMS office where no headsets are seated at any operator position. This command is normally used if a traffic office has been shut down. If the RT command is issued and headsets are seated, the system responds with a question mark and takes no action.

To release study registers associated with a traffic office, enter the following command at the QFADS TTY:

>RT traffic_office_number

For example:

>RT3

The TTY responds in the following way:

```
RT 3 OK
```

On a switch with both TOPS ACD and TOPS QMS traffic offices defined, entering the RT command at a QFADS does not release study registers assigned to TOPS ACD traffic offices. Similarly, entering an RT command at a FADS device does not release study registers assigned to a TOPS QMS traffic office.

RQ command

The RQ command lists all of the operator numbers assigned to a study register. When the RQ command is issued, the system responds by listing the number of registers assigned in the traffic office, followed by the total number of study registers available for assignment (defined in parameter QMSFM_NUM_STUDY_REG in Table OFCENG), and the number of study registers currently in use by each traffic office.

To list all the operator numbers assigned to the operator study data system, enter the following command at the QFADS TTY:

>RQ

The TTY responds in the following way (for example):

```
SYST     12/120

TO1       5
TO2       3
TO3       4
```

In an office with both TOPS ACD and TOPS QMS teams, when the RQ command is entered at a QFADS device, the number of study registers assigned to TOPS ACD teams is not returned. Similarly, when the RQ command is entered at a FADS device, the number of study registers assigned to TOPS QMS teams is not returned.

The RQ command may also be entered from a QTADS device. When the RQ command is entered from a QTADS device, the system responds by printing the operators assigned to study registers within the team and the total number of study registers assigned to operators within the team.

To list all the operator numbers assigned to the operator study data system in one traffic office, enter the following command at the QTADS TTY:

>RQ

The TTY responds in the following way (for example):

```
TO   2     5

      92
     289
     311
     571
    1133
```

RD command

The RD command prints out an operator's accumulated study data, which includes operator number, date, time, the number of position seizures and the AWT accumulated by the operator's study register, segregated by QMS FM call class. It also prints a total number of position seizures and average AWT over all the QMS FM call classes, the operator number, the time, and the date.

The display of system AWT is controlled by the parameter QMSFM_DISPLAY_AWT in Table TQMSOPT. System AWT is displayed for the prior 15-minute reporting period.

To see an operator's accumulated study data, enter the following command at the QTADS TTY:

>RD operator_number

For example:

>RD293

The TTY responds in the following way:

```
 TO STUDY  OPR # 293 91/12/5  18:37

    QMS CALL CLASS       PS    AWT    SYST
    TOTAL               966   30.6   31.2

    UNDEFINED             0      0      0
    DELAY                 0      0      0
    DA_RECALL            32   19.2   20.1
    COIN RECALL          56   34.1   35.7
    DA                  190   19.8   20.0
    CAMA                 75    9.2    8.9
    NCN-0MINUS          163   36.4   37.1
    NCN-0PLUS           172   33.2   30.8
    CN-0MINUS            74   45.1   44.9
    CN-0PLUS             80   40.5   40.9
    CN-1PLUS            102   37.3   38.0
    HOTEL                22   27.0   27.0
```

Position control commands

TOPS QMS SA and IC positions can be removed from and returned to service by issuing the O or I command from a QTADS TTY. These commands affect only SA and IC positions within the same traffic office as the QTADS administrator.

O command

To remove an SA or IC position from service, enter the following command at a QTADS TTY:

>O position_number

For example:

>O111

If the position number is for an SA position, the TTY responds in the following way:

```
 POS #111 OFF ASST
```

If the position number is for an IC position, the TTY responds in the following way:

```
 POS #111 OFF IC
```

Entering an O immediately followed by a carriage return generates a printout of all out-of-service SA and IC positions within the team.

To print a list of all out-of-service SA and IC positions within the team, enter the following command at a QTADS TTY:

>O

The TTY responds in the following way, for example:

```
 OS POS
 POS #112 OFF ASST
 POS #120 OFF IC
```

I command

To return an SA or IC position to service, enter the following command at a QTADS TTY:

>I position_number

For example:

>I123

If the position number is for an SA position, the TTY responds in the following way:

```
    POS #123 ON ASST
```

If the position number is for an IC position, the TTY responds in the
following way:

```
    POS #123 ON IC
```

Information on operators

Two commands are used to solicit information from the DMS:

- L - prints a listing of all operators (including service assistants) currently
  logged on
- P - prints a listing of the status of all TOPS QMS positions

L command

The L command creates a listing of all operators currently logged on. The
system lists their operator numbers (OPR), the TOPS QMS position
numbers they are logged into, the QMS call queue profile number or QMS
controlled traffic profile number, and the QMS service profile index.

Note: This QMS command differs from the equivalent TOPS ACD command
in that the QMS profiles replace the TOPS ACD combined transfer profile list.

To create a listing of operators currently logged on, enter the following
command at a QTADS TTY:

>L

The TTY responds in the following way (for example):

```
   OPR     POS        CQPROF    CTPROF    SRVPROF
   114      21          2                    1
    90     108         13                    2
   283     186                    3          1
   925     445          7                    1
```

P command

The P command lists the current status of TOPS QMS positions. The system response lists the number of positions in each condition. The overall system status is printed as well as the individual traffic office statistics for the status displays shown in Table 9-6.

Table 9-6xxx
TOPS MP status displays

Display	Definition
OC	Occupied positions (headset seated), excluding those in maintenance busy mode
MB	Occupied positions that are in the make busy mode
OD	Positions that are not in service
CT	Occupied positions that are in controlled traffic mode
UCP	Unoccupied positions with a call at position and some parties off hook
UCD	Unoccupied positions with a call at position and all parties on hook
ACS	Positions at which the operator has accessed a loop without a call in progress

To print a report on the current status of TOPS QMS positions, enter the following command at the QFADS TTY:

>P

The TTY responds in the following way (for example):

```
QMS POS

        OC    MB    OD    CT    UCP   UCD   ACS
SYST    87    14    5     3     2     1     2

TO1     29    5     2     0     0     0     0
TO2     31    4     0     2     1     0     1
TO3     12    3     1     0     1     1     0
TO6     15    2     2     1     0     0     1
```

Because data is printed only for teams datafilled as QMS in Table TEAMACD, team numbers are not necessarily printed in numerical order.

QMS position states are the same as those for TOPS ACD, excluding the TOPS ACD transfer states (such as OC2, MB2, and so forth).

Silence Sonalert tone

A Sonalert tone sounds at a QFADS position when one of a number of critical system events occurs. Entering the S command at a QFADS TTY silences the Sonalert at that position.

S command

To silence the Sonalert tone at a QFADS TTY, enter the following command at that QFADS TTY:

>**S**

It is not necessary to press **RETURN**. The TTY responds in the following way:

```
>
```

Report QMS call queue conditions

Force managers should be aware when three special queue conditions occur:

- calls deflecting (QCD)
- calls waiting (QCW)
- calls in queue without operator (QCQ)

Every 10 seconds the DMS updates which queues have calls deflecting, calls waiting, or calls queued without an operator.

CD command

A force manger or team manager can determine which call queues are deflecting calls by entering CD at a QFADS or QTADS TTY. When the CD command is entered correctly, the system replies by printing the date, the time, and the call queues that are deflecting calls.

To print the call queues that are deflecting calls, enter the following command at a QFADS or QTADS TTY:

>**CD**

The TTY responds in the following way, for example:

```
QMS QUEUES   91/11/23   3:34:07

CQ1
CQ11
```

CW command

A force manger or team manager can determine which call queues have calls waiting by entering CW at a QFADS or QTADS TTY. When the CW command is entered correctly, the system replies by printing the date, the time, and the call queues that have calls waiting.

To print the call queues that have calls waiting, enter the following command at a QFADS or QTADS TTY:

>**CW**

The TTY responds in the following way, for example:

```
QMS QUEUES   91/11/18   21:34:56

CQ7
CQ12
```

CQ command

By entering CQ at a QFADS or QTADS TTY, a force manager or team manager can determine which call queues have calls but no operators assigned. When the CQ command is entered correctly, the system replies by printing the date, the time, and the call queues that have calls but not operators assigned.

To print the call queues that have calls but no operators assigned, enter the following command at a QFADS or QTADS TTY:

>**CQ**

The TTY responds in the following way, for example:

```
   QMS QUEUES   91/11/18   21:34:56

CQ4
CQ8
```

FM administrative procedures

The vehicle for force planning is the force program. A long-range force program should be prepared and maintained for a period of 12 to 15 months. Successful force planning depends on the accumulation of complete and accurate historical records.

Each week, the short-range force program for the office must be extended to a realistic estimate of the force required for each of the seven days of the week ahead. The daily estimates are used to develop half-hourly operator requirements that serve as the basis for the daily tour schedule and for the assignment of operators to tours and days off.

This chapter contains the TOPS MPX hundred call second (CCS) force management administrative procedures and forms. The procedures described are specific to TOPS MPX and CCS force management (or both) and do not include procedures pertaining to the force management of a particular operator services office. Examples of the latter include estimating call volumes, planning force programs, preparing and assigning operators to tour schedules, and maintaining personnel and payroll records.

This chapter describes the TOPS MPX CCS force management administrative procedures to the point where they overlap traditional force management procedures that apply in any non-CCS operator services system.

The information in this section applies to both single- and multitraffic office TOPS MPX unless otherwise noted.

Definitions

The following terms and definitions are used in this chapter:

- Average work time (AWT) is the average amount of time an operator requires to handle a call. For force planning purposes, the AWT includes all call types and is calculated on a system basis.
- Average speed of answer (ANS) is the average length of time an incoming call waits in a queue for operator answer.

- Work volume (WV) is the total amount of time all operators spend handling calls within a given time period. For force planning purposes, the WV is calculated for each half hour or quarter hour, includes all call types, and is calculated on a system basis.

- Percent occupancy (%OCC) is the ratio of the portion of operator time spent handling calls to the total time operators are logged on to TOPS MP positions for the purpose of handling calls. Percent occupancy should never be as high as 100% for the following two reasons:

  - Operator fatigue would lead to a higher AWT.

  - If all operators were occupied handling calls, none would be available to answer calls as they arrived, and the ANS would increase to unacceptable levels.

The ideal level of occupancy varies with the size of the work force, assuming that the desired ANS and AWT remain constant. If the work force is relatively small, extra operators are needed to ensure that there is an operator available to answer incoming calls within the desired ANS. As the size of the work force increases, the larger number of operators increases the chance that operators will be available to handle incoming calls, and percent occupancy can increase without endangering ANS. The half-hourly force capacity tables are based on a percent occupancy equal to 92 percent, the maximum value that maintains efficiency.

- Ready-to-serve time is the percentage of time that operators spend *not* handling calls. The formula for calculating ready-to-serve time is as follows:

  - Ready-to-serve time $=$ 100 percent occupancy

TOPS MPX half-hourly CCS force capacity tables

CCS force management depends on two components:

- measurement data obtained from the DMS through the force administration data system (FADS)

- half-hourly force capacity tables that enable the force supervisor to determine the number of operators required every half hour to provide prompt customer service

The TOPS MPX half-hourly force capacity tables are based on the following assumptions:

- When the number of operators corresponds to table requirements over a number of half hours, the ANS should be 2.1 seconds or less.

- As the size of the operator team increases, operator percent ready-to-serve time is not reduced below eight percent.

- Under overload conditions (a five-percent increase in work volume hundred call seconds [WV-CCS]) the ANS should not exceed 10.0 seconds, averaged over a number of such half hours.

Note: The last two fixed assumptions provide protection against the likelihood that relatively small errors in the estimation of offered load, or the provision of operators, would create inordinate delay for subscribers.

A TOPS MPX half-hourly force capacity table consists of three parts:

- operators required, listed vertically in the far-left column
- AWT, banded into 15 columns across the top of the table
- WV-CCS, in the body of the table

To determine the half-hourly operator requirements, the force supervisor must consider two things: the WV-CCS and the AWT. The estimated WV-CCS is the estimate of call initial position seizures (IPS) or position seizures (PS) AWT. The AWT determines which column to reference in the capacity table. The WV-CCS, under the appropriate column, determines the number of operators required.

For example, assume an AWT of 45 seconds and an estimated work volume of 360 CCS. Consult Table 10-1 under the column labeled 40.5 - 45.4 seconds and read down until the 360 CCS is within a range of WV-CCS. The 360 CCS is in the range 348-364 CCS. Reading laterally to the left, the table shows that 24 operators are required to handle that call load with an average answer time of 2.1 seconds.

For high levels of WV-CCS (above 3320 CCS), the required number of operators does not vary with the AWT. The *TOPS MPX NT DA Planning and Engineering Guide,* 297-2291-154, provides a copy of all of the half-hourly force capacity tables.

The capacity table is based on predictable relationships between the work volume, the number of operators, and the amount of time operators spend handling calls and doing other necessary work. The work volume is estimated for the TOPS MPX as a whole.

The TOPS MPX half-hourly force capacity tables are computed using a modified Erlang C mathematical model. The values derived and summarized from the force capacity table are used throughout the range of CCS force management activities.

The following items depend on the information in the capacity table:

- force planning
- tour schedule preparing
- weekly and daily estimating
- intraday force projecting
- efficiency evaluating

Table 10-1
TOPS MPX half-hourly force capacity table

Actual work time (seconds) and work volume (CCS)

Operator	13.5-17.4	17.5-21.4	21.5-25.4	25.5-30.4	30.5-35.4	35.5-40.4	40.5-45.4	45.5-50.4
1	0-3	0-2	0-2	0-2	0-1	0-1	0-1	0-1
2	4-20	3-18	3-17	3-16	2-15	2-14	2-14	2-13
3	21-35	19-33	18-31	17-30	16-28	15-27	15-26	14-25
4	36-50	34-48	32-46	31-44	29-42	28-41	27-40	26-39
5	51-66	49-64	47-61	45-59	43-57	42-55	41-54	40-53
6	67-82	65-79	62-77	60-74	58-72	56-70	55-69	54-67
7	83-99	80-96	78-93	75-90	73-88	71-86	70-84	68-82
8	100-116	97-112	94-109	91-106	89-103	87-101	85-99	83-98
9	117-132	113-129	110-126	107-122	104-119	102-117	100-113	99-113
10	133-149	130-145	127-142	123-139	120-136	118-133	114-131	114-129
11	150-167	146-162	143-159	140-155	137-152	134-150	132-147	130-145
12	168-184	163-179	160-176	156-172	153-169	151-166	148-163	146-161
13	185-201	180-196	177-193	173-189	170-185	167-182	164-180	162-178
14	202-218	197-213	194-210	190-205	186-202	183-199	181-196	179-194
15	219-236	214-230	211-227	206-222	203-219	200-215	197-213	195-210
16	237-253	231-248	228-244	223-239	220-235	216-232	214-229	211-227
17	254-270	249-265	245-261	240-256	236-252	233-249	230-246	228-243
18	271-287	266-282	262-278	257-273	253-269	250-266	247-263	244-260
19	288-305	283-299	279-295	274-290	270-286	267-283	264-279	261-276
20	306-322	300-317	296-313	291-308	287-303	284-300	280-296	277-293
21	323-340	318-334	314-330	309-325	304-320	301-317	297-313	294-310
22	341-357	335-352	331-347	326-342	321-338	318-334	314-330	311-327
23	358-375	353-369	348-364	343-359	339-355	335-350	331-347	328-344
24	376-392	370-386	365-382	360-376	356-372	351-368	348-364	345-361
25	393-410	387-404	383-399	377-393	373-389	369-385	365-381	362-378

Supplementary force capacity tables for call transfer

The call transfer feature enables certain operators to transfer calls to other operators within the same TOPS MPX. One application of this feature allows a unilingual operator to transfer a call to a bilingual operator in the event of language incompatibility with a subscriber. For more information on the call transfer feature, refer to Chapter 5, "Force management features."

At low levels of call transfer, the overall efficiency of the TOPS MPX operating team is not significantly affected, and more operators are not required. The increased volume of transferred calls directly affects the capacity of the team to maintain the grade-of-service criteria. Eventually, more operators must be provided to absorb the additional work associated with transferring the call.

Supplementary force capacity tables help determine when additional operators are required. Call transfer is used when the majority of the operators can handle all call types. This minimizes the volume of calls transferred and the additional operators required to handle transferred calls. The call transfer provisioning tables do not indicate values beyond 1.20, providing for a maximum staff increase of 20% over the original total of required operators in order to handle transferred calls.

The potential requirement for additional operators is caused by the subscriber-to-operator language mix, or more specifically, by the following:

- the percent of calls offered by minority language subscribers
- the percent of available operators who are bilingual

The supplementary force capacity table is organized in two main parts:

- percent of bilingual operators available (in descending percentages), located in the first column at the left
- percent minority language calls (in ascending percentages, includes a series of provisioning coefficients in the body of the columns), located in the several columns to the right

To determine whether additional operators are required, and if so, how many, the force supervisor must perform the following actions:

1   Determine overall operator requirements.

2   Read down the first column of the supplementary force capacity table to a percentage corresponding to the percent bilingual operators available. If the percentage of bilingual operators available falls between percentages (for example, 82.5%), the lower percentage (82% in this example) should be used. The lower percentage corresponds to the higher provisioning coefficient and ensures that service criteria are met.

3   Read across to the appropriate column corresponding to the percentage minority language calls offered.

4 Determine the provisioning coefficient where the two points intersect.

5 Multiply the total number of required operators by the coefficient from the supplementary capacity table, rounding up or down as appropriate (for example, 24.3 = 24 and 37.6 = 38).

6 If the coefficient has increased the total number of operators required, determine the number of bilingual operators required by multiplying the number of total operators required by the percentage of bilingual operators available. Always round up in this process (for example, 24.1 = 25 operators required).

7 Determine the number of unilingual operators required by deducting the number of bilingual operators required from the total number of operators required.

Volume records

The daily, weekly, and monthly call volume and work volume records described in the following paragraphs provide a means of systematically recording volume data for future use.

The data recorded in these forms, referred to as historical data, are the basic information necessary to estimate operator requirements. Accurate estimates of calls and work volume require reference to historical records.

In a TOPS MPX with more than one traffic office, the historical records that pertain to call volumes are maintained on a total TOPS MPX basis. Forms that are used to record AWT data are maintained for each traffic office as well as for the total TOPS MPX.

Monthly volume data - Form FM 904

Form FM 904 is used to maintain monthly comparisons, for a period of years, of average traffic volume for business days, Saturdays, Sundays, and holidays. Data assembled on this form are used primarily to determine traffic estimates for long-range force programs.

Weekly call volume data - Form FM 906

Form FM 906 is used to maintain a record of weekly traffic volumes. This data can then be used to make call estimates for short-range force programs and the weekly estimating process. Percentages are computed by comparing each week's traffic volume with that of the average week, the previous week, and the same week of the previous year.

Daily traffic record - Form FM 905

Form FM 905 is maintained in all TOPS MPX installations where daily traffic volumes fluctuate sufficiently to affect the number of employees on duty each day. A record of daily AWT is kept on this form so that weekly estimates, made from data on Form FM 906, can be broken into daily

estimates for day-to-day force provisioning. This process is consistent with the method that uses Form FM 4915A to develop daily force requirements.

A separate Form FM 905 should be used to record AWT daily and weekly. Weekly estimates of AWT are necessary to prepare short-range force programs. Daily AWT estimates are required for the force estimation process that utilizes Form FM 4915A.

The remarks space on Form FM 905 should be used to record any unusual circumstances that have affected call volumes or AWT. Examples would include storms, power failures, or major conventions.

Daily traffic record by periods of the day - Form FM 905A

Form FM 905A can be used to record AWT by period of the day, by the total day, and by average business day (ABD). Form FM 905A can thus be used in place of Form FM 905 for recording daily AWT. The period of day AWT is used as part of the estimating process that utilizes Form FM 4915.

Force planning

The force program is an administrative tool that gives the in-charge manager and the force supervisor a systematic method of determining future force requirements on both a short-range and long-range basis. The purpose is to configure the force available in future months or weeks with the force required to meet subscribers' needs for service and to accommodate training, vacations, absences, and other necessary items such as management, instruction, and clerical hours.

All operator services offices and systems require force programs. To accommodate TOPS MPX, the force program currently in use in an operating company may require only minor modifications to several lines at the top of the form. The TOPS MPX FADS and the TOPS MPX half-hourly force capacity table add precision to the estimation of work volume and the determination of board hours. The following paragraphs describe the procedures and the historical trend data used to estimate board hours.

Historical trend data for force programs

The historical trend data used in estimating board hours for long-range and short-range force programs consist of measurements of calls (IPS or PS), work volume, and efficiency. The data are summarized by ABD.

Miscellaneous data - Form FM 907

Form FM 907 is used to record ABD summaries of efficiency measurements, some of which are used for force programming purposes. The source for the entries on this form is the Daily and Monthly Productivity Report, Form FM 2580. The data should be averaged for the business days in the calendar month, excluding unusual days. If the effect of a holiday or other recurring events requires a special one-day or two-day estimate, these

days should be noted in the Remarks space on Form FM 905, Daily Traffic Record.

Items recorded on Form FM 907 are as follows:

- Actual work time per call - Enter the ABD actual work time for the month, from Form 2580. Space is also provided to record average Saturday and average Sunday actual work time for each month.
- CCS board hour, actual (ABD) - Enter the actual CCS per board hour for the month. The value is computed from ABD data on Form 2580:
  - Actual Work V ol. CCS (Col 8)/ Scanner board hours (Col 14) - Actual CCS board hours, used on force programs, builds in the ready-to-serve time required based upon past empirical data. It reflects the over- or under-provisioning of board hours that occurred for the actual WV-CCS.
- CCS board hour, standard (ABD) - Efficiency measurements; operating, overall, ratios; and operator team, schedule, administrative - The accurate estimation of board hours for force programs does not depend on these additional efficiency measurements and ratios. Where appropriate, the monthly ABD measurements and ratios may be copied from Form FM 2580 (Daily and Monthly Productivity Report) to Form FM 907 (Miscellaneous Data).

Estimating board hours for long- and short-range force programs

Estimates of board hours for future months or weeks are developed as follows:

1 Estimate the call volume.
2 Estimate the AWT.
3 Compute the estimated WV-CCS using the following formula:
   - WV-CCS = (IPS or PS/AWT) / 100.
4 Estimate the CCS/board hour.
5 Compute estimated board hours using the following formula:
   - Estimated board hours = WV-CCS + (CCS/board hours)

Calls are estimated using period over period and curve projection methods and by estimating future trends. The historical volume records described in "Volume records" on page 10-6 provide the database on which call estimates are developed. Call volume estimates, particularly for long-range force programs, reflect information from various sources including the Traffic Engineering/Facilities group.

Estimates of AWT are usually based on current operator efficiency levels and are modified to reflect the following considerations:

- current and proposed training activities that improve operator efficiency

- addition of inexperienced operators or, conversely, an improvement in experience levels
- proposed operating practice changes
- improved customer acceptance of expanded dialing capabilities
- improvement in network completion rates
- improved speed of answer or service at auxiliary switchboards
- changes to end-office equipment that affect trunking to TOPS MPX and the discrimination of call types within TOPS MPX
- addition of ANI equipment in end offices
- changes in the mix of call types
- other recurring variations in AWT detected from historical records

Estimated WV-CCS is computed for each future month or week on the force program, using the following formula:

- Estimated WV-CCS = (Estimated IPS or PS/ Estimated AWT)/ 100

CCS per board hour is the amount of WV-CCS handled during the average operator hour. There are 3600 seconds, or 36 CCS, in one hour. If operators were occupied handling calls one hundred percent of the time, the CCS per board hour would be 36 and the ANS would be unacceptably high. Actual CCS per board hour (ABD) is recorded on Form FM 907, Miscellaneous Data.

The force program estimate of CCS per board hour for future months or weeks is based on projections of current actual CCS per board hour. This estimate would represent an extension of the empirical ready-to-serve time percentage reflected in recent trend data.

This projection can be modified in anticipation of improvements in the precision of force scheduling. The projection reflects any significant changes in the volume of work estimated for the TOPS MPX. In this case, a half-hourly distribution of WV-CCS may be necessary. Use the TOPS MPX half-hourly force capacity tables to estimate the effect on CCS per board hour.

The force program estimate of board hours is computed by dividing estimated WV-CCS by estimated CCS per board hour.

Tour schedules

TOPS MPX operator tour schedules are prepared by developing quarter hourly operator requirements from trended CCS work volumes. Because the TOPS 04 FADS provides accurate work volume data, the distribution of operator requirements throughout the day can be precise.

While WV-CCS is usually obtained for half hour periods, quarter hourly measurements are taken periodically to determine exact operator requirements, particularly during periods when the work volume is fluctuating. The FM15 periodic reports generated at the system administration data system (SADS) or FADS TTY show 15-minute accumulations of WV-CCS. This information may be recorded in the space provided on Form FM 48, half-hourly force data.

An operator tour schedule provides the best estimate of the number of operators needed at TOPS MPX positions each quarter hour. The level of the total day work volume and distribution of the operators' CCS work volume within the day tend to have seasonal patterns for a given area or community.

From historical records of calls, AWTs, and CCS work volumes, the life of the schedule may be determined by selecting an average basis for the schedule for a period during which deviations from the average are minimal. This period varies with the nature of the traffic handled and with changes in the engineered work volume for each TOPS MPX.

There are two types of tour assignment plans:

- The first plan provides a schedule of tours that meets a basic or average level of requirements, and supplements that basic schedule with a few more tours each day. This is more economical than redrawing requirements for the entire schedule each day. Providing a stable number of tours representing 70-90 percent of average daily requirements reduces the work of scheduling the supplementary tours.

- The second plan provides an open-scheduling procedure that potentially reassigns all tours each day, giving full recognition to seniority choices for all tours in the schedule. Open-scheduling provides increased flexibility to management and the operator force for changes in schedule introduction and tour preferences.

Both assignment plans benefit from having a substantial number of basic tours remaining constant, thus reducing the repetitive work of assigning the same name to the same tour each day.

Total operator requirements are developed from the standard TOPS MPX half-hourly force capacity table. The half-hourly estimated work volume is used as an index into the capacity table to derive the total half-hourly operator requirements (basic plus supplementary). The number of operators

in the basic schedule is then deducted from the total requirements, leaving the supplementary requirements for that tour. The supplementary operator requirements must not be developed directly from WV-CCS.

Operator requirements from 2 A.M. to 6 A.M. are usually based on the work volume offered in the busiest half hour during that period. The night force generally remains constant.

Estimated quarter- or half-hourly operator requirements should follow the flow of traffic as precisely as possible. Another recommendation is that tours be selected to provide exactly the number of operators required. The excess can be minimized by smoothing the required line from quarter hour to quarter hour. If tours are permitted to start and end on quarter hours, with similar flexibility for lunch periods, the excess can be minimized.

When preparing supplementary tours, it may be more economical to permit a small scattered shortage (usually under a 0.5 percent total day and not over 2.0 percent in any quarter hour) in exchange for substantially reducing the excess quarter hours.

Schedules based on CCS-measured work volumes are continuously evaluated for effectiveness by trending the level and distribution of the continuing flow of CCS data. As work volumes or their distribution within the day change, supplementary tours may become difficult to select while constraining the excess or shortage within reasonable limits. If the efficiency of the schedule and the quality of the speed of answer deteriorate or require too many intraday adjustments, the basic schedule should be replaced. Either Form FM 4915 or FM 4915A provides a good basis for comparing current smoothed-average half hour operator requirements with the requirements on which the schedule is based.

In a TOPS MPX with more than one traffic office, the master schedule must be allocated among the various offices. "Multitraffic office TOPS MPX," on page 10-38, contains the additional considerations relevant to this process.

Half-hourly force requirements - Form FM 916

Form FM 916 (see Figure 10-1 on page 10-14) provides a procedure for calculating quarter-hourly basic-schedule operator requirements. The procedure employs historical smoothed-average WV-CCS distributions, along with estimated total day calls and AWT for the lowest day in the expected life of the schedule.

Use the following instructions to fill out the FM 916 form:

1   Columns 1-3 - Distribution WV-CCS

a. In Columns 1 and 2, enter the CCS work volume for each half hour, taken from the smoothed-average work volumes shown on Forms FM 4915/4915A for the week(s) that best represent(s) the average distribution for the scheduled period. The representative week(s) are often from the previous year's scheduled period.

The selected week may be any average mid-week (the middle week in the corresponding period of the previous year), when the work volume distribution for this week is considered to be representative for future schedule distribution. Alternatively, two representative weeks may be selected from the previous year's corresponding period.

When a schedule is expected to be in effect for three months, the fifth and twelfth (middle and last) weeks may be selected from the previous year, if their distribution is considered representative. More current influences on distribution may be taken into consideration by including a recent week in Column 1 or 2. The ABD distribution is obtained by adding half-hourly smoothed-average CCS (AVG CCS) for Monday to Friday, laterally across Form FM 4915/4915A, and dividing by 5. The resulting half-hourly smoothed-average CCSs are entered in Columns 1 and 2.

b. The average distribution is entered in Column 3, if more than one week of smoothed-average distribution has been selected. At the bottom of Column 3, enter the sum of the half-hourly WV-CCS.

2   Lines 8-11 - Basic Schedule Estimates

a. The estimated number of total-day calls from which the basic schedule is derived is entered on line 8. Basic schedule calls are obtained by estimating the number of calls for the lowest day in the scheduled period, and then reducing this estimate by about five percent. The reduction percentage may vary from five percent in inverse proportion to the confidence in the low-day estimate.

b. The estimated Basic AWT is entered on line 9. This estimate is based on the current AWT and adjusted to reflect anticipated changes that could affect its value. The estimation process includes a review of Form FM 905/905A, which shows AWT by day, to search for significant daily deviations from average business day AWT.

c. Basic schedule WV-CCS is entered on line 10. Multiply IPS or PS (line 8) by AWT (line 9) and divide the product by 100 to convert to CCS.

d. The volume adjustment factor on line 11 is obtained by dividing the total-day Average smoothed-average CCS in Column 3 into the Basic WV-CCS on line 10. Calculate the factor or ratio to two decimals, and enter the result on line 11.

3   Columns 4-5 - Basic Schedule

a. Apply the ratio on line 11 to Column 3 for each half hour, and enter the product in Column 4.

b. Use the TOPS MPX half-hourly force capacity table to develop the half-hourly operator requirements in Column 5. These half-hourly requirements should be reviewed so that relatively large changes between half hours can be converted to smaller changes between quarter hours. Form FM 48, half-hourly force data, should reflect periodic 15-minute studies of WV-CCS for this purpose. During periods of increasing or decreasing work volume, the two quarter hours should be divided in a way that provides operators relative to the flow of traffic.

4   Columns 6 and 7 are not used.

Figure 10-1
Form FM916

Half-Hourly Force Requirements

Date_____ Requirements for _____ Office_____

Time	Distribution Work Volume CCS			Basic Schedule			
	Week of	Week of	Average Smoothed Average	Work Volume CCS	Operator Require-ments		
	1	2	3	4	5	6	7
6-6:30							
6:30-7							
7-7:30							
7:30-8							
8-8:30							
8:30-9							
9-9:30							
9:30-10							
10-10:30							
10:30-11							
11-11:30							
11:30-12							
12-12:30							
12:30-1							
1-1:30							
1:30-2							
2-2:30							
2:30-3							
3:30-4							
4-4:30							
4:30-5							
5-5:30							
5:30-6							
6-6:30							
6:30-7							
7-7:30							
7:30-8							
8-8:30							
8:30-9							
9-9:30							
9:30-10							
10:30-11							
11-11:30							
11:30-12							
12-12:30							
12:30-1							
1-1:30							
1:30-2							
2-6 AM							
Total day							

  8. Basic Schedule Calls_____
  9. Basic Actual Work Time_____
 10. Basic Work Volume CCS_____
 11. Volume Adjustment Factor (10 + 3)_____

Weekly force estimation

This section describes the process of taking the ABD or total day estimates of call volumes and total day or period-of-day estimates of AWT and using mathematical techniques to determine half-hourly operator requirements for each day.

Providing the force required to give prompt customer service, consistent with economical operation of the operator services office, is achieved through accurate forecasts of WV-CCS and operator productivity. The weekly force plan should be based on the best possible estimate of anticipated call volumes, AWT, and efficiency levels consistent with the TOPS MPX half-hourly force capacity table.

Weekly volume and force estimate, Forms FM 4915, FM 4915A

To develop operator requirements for each day of the week and to determine the half-hourly distribution of the operator force, a procedure for estimating WV-CCS has been developed that uses Form FM 4915 or FM 4915A. This procedure requires estimates of call volumes and AWT that combine to produce the total day or session WV-CCS. The half-hourly distribution of the WV-CCS determines precise operator requirements to provide an ANS.

The estimated call volumes used in this procedure are obtained from historical data, curve projections, or period-over-period volume records. AWT is estimated from trend data. Distribution of work volume is developed by exponentially smoothing average trends with adjustments based on good judgment. Once the amount of WV-CCS and its distribution throughout the day have been determined, the number of operators required to handle that work volume is determined from the TOPS MPX half-hourly force capacity table.

The following alternate weekly volume and force estimate forms are used to permit some flexibility in planning force requirements:

- Form FM 4915 is recommended for use in offices where the relationship of call volumes and AWT in the sessions of a given weekday varies from week to week.
- Form FM 4915A is appropriate in offices where the AWT varies between sessions of a day in a relatively consistent pattern. For example, the AWT for Tuesday morning sessions may be several seconds lower than the afternoon, while the AWT in the evening sessions is substantially longer than in the afternoon. If these or any other relationships are generally consistent for a particular day of the week, Form FM 4915A is recommended.

The process treats each day of the week discretely. Estimates for Mondays incorporate historical distributions for previous Mondays as well as the distribution of work volume for the most recent Monday. This process applies for all seven days of the week.

Form FM 4915

Form FM 4915 is used to develop half-hourly operator requirements based on the estimates of session call volumes and AWT.

The upper portion of Form FM 4915 is used to estimate ABD and daily values for the following items:

- smoothed-average calls
- estimated total calls
- estimated actual work times
- estimated CCS work volume

The estimates are recorded for four periods of the day as well as for the total day. ABD call volumes are estimated from the curve projection or period-over-period data.

The estimated calls are multiplied by the AWT for the appropriate day of the week to produce WV-CCS.

Columns 1 through 9 in the upper portion of Form FM 4915 contain space for developing smoothed-average calls for ABD and each day of the week. The two-part exponential smoothing process is an averaging technique that helps predict daily and session trends of traffic call volumes:

- The historical trend of calls is given a weighting of 70 percent (or 0.70).
- The most recent week's calls are weighted at 30 percent (or 0.30).

The two combine to form 100 percent of the calls expected in the week ahead. This is shown in the following example:

```
Smoothed-average calls (history) = 10,000 calls / 0.70  = 7,000

Recent day calls                 = 10,900 calls / 0.30  = 3,270
                                                          _____
New smoothed-average calls                                10,270
```

When an individual day's current value is abnormal, it is adjusted by weighting the historical smoothed-average at one hundred percent. If the current week's call volume or work volume distribution is affected by a condition that persists for several months (Daylight Saving Time, school opening, or closing), history and current week weighting can be adjusted to reflect the new condition, history at 20 percent and the current week at 80 percent.

On the lower portion of the form, the session work volume is distributed half-hourly using smoothed-average work volumes. The smoothed-average

WV-CCS is increased or decreased, in proportion to the level of the estimated work volume.

Based on the estimated work volume, the operator requirements are determined from the TOPS MPX half-hourly force capacity table and entered for each half hour in the lower part of Form FM 4915.

Three forms are required for weekly estimations:

- blank FM 4915 (Weekly Volume and Force Estimate)
- the previous week's completed FM 4915
- TOPS MPX half-hourly force data, FM 48 for the most recent seven days or eight days, as required for the schedule assignment process

The top portion of Form FM 4915 is completed first, a section at a time, columns 1 through 25. Use these instructions for filling out the FM 4915 form.

1   Columns 1 through 9, smoothed-average calls

   a. Using the previous week's Form FM 4915, weight each session at an appropriate value (such as 0.70), and weight the most recent day sessions (recent week's daily data) at 0.30 to develop calls by session.

   b. Enter the total smoothed-average calls (by session) in columns 1, 3, 5, and 7.

   c. Enter the sum of each session in column 9, Total day.

   d. Determine the ABD Total day figure by totaling the Monday through Friday figures in column 9 and dividing by 5. Enter this figure at the top of column 9.

   e. Determine the ratio of each session to its total day and enter the percentage beside the volume for the session in columns 2, 4, 6, and 8. This procedure starts with Tuesday's calls and each successive day, until the following Tuesday morning, is added. At that time, data for Monday are added.

2   Columns 10 through 15, Estimated total calls

   a. Estimate the ABD calls for the week ahead (this usually can be done on the preceding Tuesday) and enter the results in column 10.

   b. Develop a ratio of smoothed-average total day calls (ABD) (column 9) to estimated Total ABD calls (column 10), carried to three decimal places. Apply the ratio to the total day volumes, column 9, to develop the daily estimates for the week ahead, column 10.

   c. Review the total day call-estimating procedure and determine the deviation from trend data. If the smoothed-average trend result estimates are modified, enter these results in column 11.

    d. Apply the daily session percentages (in columns 2, 4, 6, and 8) to column 10 totals to estimate calls by session of the day (columns 12, 13, 14, and 15).

3 Columns 16 through 20, Estimated AWT

- In most offices, the AWT is substantially different for each session. The AWT, which directly affects operator requirements, becomes an important controlling factor in reaching the efficiency goals stated in the Short Range Force Program. The in-charge manager and the force supervisor determine the AWT. It reflects a realistic and optimal level for each session of the day. The session AWT, when weighted by session calls, should total the AWT goal established for the day. The AWT figures are entered in columns 16, 17, 18, 19, and 20. Before estimating the AWT for each day of the week, careful consideration should be given to any unusual events that could influence the AWT, such as new operators added to the force, or anticipated changes in call mix.

4 Columns 21 through 25, Estimated CCS work volume

    a. Complete columns 22 through 25 by multiplying the AWT (columns 17 through 20) by the estimated calls (columns 12 through 15) for the respective sessions. The basic force formula is:

      - WV-CCS = (IPS or PS/ AWT)/ 100.

    b. Column 21 is the sum of columns 22 through 25.

    c. Transcribe the estimated CCS work volume to the lower portion of the form in the EST CCS columns provided for total day and session estimates.

    d. Develop the smoothed-average half-hourly WV-CCS as described previously, and enter it in the AVG CCS columns.

    e. Add the half-hourly CCS from the same days in the previous week's smoothed-average (normally weighted at 0.70) to the most recent day's half-hourly actual WV-CCS (normally weighted at 0.30) to give the smoothed-average WV-CCS for the half hour.

    f. Enter the session AVG CCS, which is the average of the half-hourly CCS values in the session.

5 Develop a ratio between the AVG CCS and the EST CCS work volume for each session to factor the half-hourly smoothed-averages (AVG CCS) to the estimated level for the week ahead.

6 Multiply each of the AVG CCS values by the ratio to arrive at the new EST CCS work volume by half hour for the coming week. This ratio reflects the call volume and AWT expected during each session of the day.

7 Use the EST CCS work volume to find operator requirements from the TOPS MPX half-hourly force capacity table. Enter each half-hourly operators required in the column labeled Table.

8   Enter the basic schedule of half-hourly requirements, shown in the column beside the Oprs Req'd - Table column.

9   Deduct this value from the table requirements. The balance is the supplementary operator requirements for the office. Schedule supplementary operator tours to provide the number of operators to meet this line of operator requirements.

Copy the Half-Hourly Oprs Req'd - Table column in column 12 of Form FM 48, TOPS MPX half-hourly force data, for each day. The scheduling process, after the supplementary operator tours have been assigned, may result in a scheduling of operators that does not precisely match the Oprs Req'd - Table column for each half hour. Copy the half-hourly operators scheduled, including any excess or possible shortage, in column 13 of Form FM 48. Finally, copy the half-hourly EST CCS work volume in column 7 of Form FM 48.

Form FM 4915A

Form FM 4915A is used to develop half-hourly operator requirements based on total day estimates of call volumes and AWT.

The upper portion of Form FM 4915A is used to make the following estimates:

*   ABD calls

*   the percent each day is of ABD calls

*   total day calls

*   the AWT for each of the seven or eight days as locally appropriate

*   the estimated WV-CCS for each day

Use these instructions for filling out the top of Form FM 4915A.

1   Record the estimate of ABD calls. The estimate is derived from historical records and developed using curve projection and period-over-period methods. These and other circumstances that may affect call estimates are taken into account.

2   From Form FM 905, Daily Traffic Record (Calls), estimate the percentage that each of the days represents of the ABD estimate.

3   Using the FM 905 estimated percentages, calculate the estimated total calls for each of the days of the week.

4   Estimate the AWT for each of the seven or eight days, using historical data with respect to circumstances that can affect operator efficiency. An anticipated change in the call mix or the addition of several new operators to the force can affect the AWT. The force supervisor and the in-charge manager estimate the total day AWT.

5   For each day, multiply estimated total calls by estimated AWT, and divide by 100 to obtain estimated CCS work volume.

The bottom portion of the form is used for the following:

- new smoothed-average WV-CCS
- a ratio between total day smoothed-average WV-CCS and total day estimated WV-CCS
- a distribution of total day estimated WV-CCS over the half hours of the day
- half-hourly operator requirements from the TOPS MPX half-hourly force capacity table

The forms required to complete Form FM 4915A are:

- new Form FM 4915A (blank except for the top four lines)
- the previous week's completed Form FM 4915A
- TOPS MPX half-hourly force data, Form FM 48 for the most recent seven or eight days as locally appropriate

The following procedures for completing the lower part of the form use Friday as an example.

1   Transfer the estimated CCS work volume figure for Friday from the top portion of new Form FM 4915A to the bottom of the same form, under the heading FRIDAY in the vertical column EST CCS, where that column intersects with the horizontal line TOTAL.

2   Using the half-hourly AVG CCS for Friday on the previous week's completed Form FM 4915A, multiply each of the half hour CCS values by 70 percent (0.70). At this moment, the AVG CCS column on the previous week's completed form is called the old smoothed-average CCS.

3   Take the TOPS MPX half-hourly force data, Form FM 48, for the most recent Friday. Multiply the half-hourly actual WV-CCS (column 7 on Form FM 48) by 30 percent (0.30).

4   For each separate half hour, add the two results from steps 2 and 3, and enter the total on the new Form FM 4915A under the heading FRIDAY and in column AVG CCS. When all half hours are complete, the new smoothed-average CCS has been developed.

5   Enter the sum of all half-hourly entries where the FRIDAY AVG CCS column intersects with the horizontal line TOTAL.

6   Develop a ratio between total AVG CCS and total EST CCS for Friday, and enter the ratio in the space provided at the bottom of the Friday column (for example, AVG CCS = 5250, EST CCS = 5520, RATIO = 1.05).

7   Apply the ratio to each of the half-hourly AVG CCS values to factor the new smoothed-average CCS up (down) to the estimated WV-CCS.

8 Use estimated half-hourly WV-CCS from the column corresponding to total day or period-of-day AWT in the TOPS MPX half-hourly force capacity table to determine half-hourly operator requirements.

The seven or eight days of the week are completed in the same manner.

Calculating the new smoothed-average is possible with a desk calculator that can store the results of one multiplication, perform a second, and then add both products. No intermediate worksheet is required in this case.

Example: half hour
            88 (CCS)/ 0.70 = store
            94 (CCS)/ 0.30 = store
                  SUM = 90

A weight of 70 percent for the historical file and 30 percent for the most recent data are appropriate under typical circumstances. Form FM 4915 on page 10-16 describes situations where the percentages should be altered.

The FM15 report, representing 15-minute accumulations of FM statistics, identifies half hours in which the WV-CCS is not evenly spread between the two constituent quarter hours. Analysis usually reveals a recurring pattern during periods of the day when traffic volumes are ascending or descending quite rapidly. For example, in the periods 8:00 A.M. to 10:00 A.M. and 4:30 P.M. to 6:00 P.M., quarter-hour scheduling can be most beneficial. The OPRS REQ'D column on Form FM 4915A may be divided with a diagonal line separating the half hour into two quarter hours. In this way, a requirement for 18 operators between 8:30 A.M. and 9:00 A.M. may become 16/20 for respective quarter hours.

For each day of the week, the half-hourly EST CCS and OPRS REQ'D columns should be copied from newly-completed Form FM 4915A to columns 7 and 12 respectively on Form FM 48 for the week ahead.

The quarter-hourly operator requirements, as developed on Form FM 4915A for each day, should be entered on the first of the horizontal lines of the E-201.

If a basic weekday schedule is in effect for several months, the quarter-hourly operators provided by that basic schedule could be printed across the second horizontal line of a form similar to the E-201. Then, 100 copies of this form could be reproduced.

The basic schedule figures (on the second line) are subtracted from the top line required figures. The difference represents quarter-hourly operator requirements that must be filled by supplementary tours. These supplementary tours can be drawn in the remaining space on the E-201 form. The total scheduled operators (basic and supplementary), including

excess or shortage, must then be copied in column 13 of Form FM 48, TOPS MP half-hourly force data, for each day of the coming week.

Although the FM 4915A process deals in total-day call volumes and AWT (6 A.M. to 6 A.M.), operator requirements for the hours 2 A.M. to 6 A.M. are usually based on the WV-CCS offered in the busiest half hour during that period. The night force generally remains constant during this period and any excess is used for clerical and associated activities. Consequently, the AVG CCS and EST CCS columns should be completed for the 2 A.M. to 6 A.M. period, but the entry in the Operators required (OPRS REQ'D) column should represent the total number of half hours scheduled in the period.

Intraday force projections

This section describes the procedures used to make intraday force projections, and the TOPS MPX Half-Hourly Data form (FM 48).

Knowledge of the force status and control of the operator force is essential for balancing good service with economical operation. CCS measurements provide the TOPS MPX force supervisor with current data indicating the level and the trend of CCS work volume by half hour. Actual WV-CCS should be compared with estimates at appropriate times throughout the day, to update half-hourly force requirements several hours ahead. The accuracy of this process depends on the reliability of half-hourly WV-CCS estimates. When force requirements can be predicted three to six hours ahead based on a projection of current CCS work volume, operator services management in TOPS MPX can take corrective action to avoid operator surpluses or shortages.

Effective half-hourly force control has the following requirements:

- prompt recording of the FM statistics provided by TOPS MPX
- reliable estimates of half-hourly work volumes
- half-hourly operator schedule

Entries from a Daily Force Memorandum form (E-199 or similar), continuously updated, show deviations from the half-hourly scheduled number of operators. This reflects absentee replacements, loans, and absent employees.

The force projection technique is used to update the traffic estimate, revise the number of operators required, and provide information for more precise force control as follows:

1   The first review of operator requirements for the day is normally made when the force available for the morning and afternoon periods is known, and when sufficient work volume data have been accumulated to establish a reliable and predictable trend. Skilled force management provides accurate force requirements as far in advance as possible. This highlights the importance of the weekly force planning process and the precision of the operator schedule.

2   The status of the available force is determined from entries on the Daily Force Memorandum (E-199). Projected force available is obtained from this form. In the example illustrated in Table 10-2, each of the half hours shows a net of plus one operator. This net condition is used to correct the scheduled operators and project the force available for half-hourly periods being estimated.

**Table 10-2
Projected force**

TOPSTOWN	8:30	9:00	9:30	10:00	10:30	11:00	11:30	12:00
Absentees	1	1	1	1	1	1	1	1
Replacements	2	2	2	2	2	2	2	2
Net + or -	+1	+1	+1	+1	+1	+1	+1	+1

3   The projection of the available force, and comparison of the actual CCS work volumes with the estimated CCS work volumes, is normally made on Form FM 48, half-hourly force data. The example illustrated in Table 10-3, which shows the projection of the force available for 8:30 A.M. to 2:00 P.M., is based on Daily Force Memorandum entries that resulted in a net of plus one operators. The net additions are added to the number of operators scheduled each half hour. The revised operator force is shown in the Available column.

Table 10-3
Projection of the force available

Operators scheduled (including excess)		WV-CCS			Projected force status		
Time	Operators	Actual	Estimated	Projected	Revised	Available	+ or -
8:30	33					34	
9:00	36					37	
9:30	42					43	
10:00	50					51	
10:30	61					62	
11:00	65					66	
11:30	62					63	
12:00	60					61	
12:30	52					53	
1:00	49					50	
1:30	56					57	
2:00	60					61	

4 CCS work volumes for several hours ahead are projected based on the trend of actual work volumes compared to estimated work volumes. The CCS work volume trend is normally based on the most recent three or four half-hourly periods with consideration for weather, emergencies, and business conditions.

For example, if the early morning CCS work volume offered to a system is less than estimated, and fair weather is forecast for the rest of the day, and no unusual social or political events are predicted, this lower level of traffic could be expected to continue for several hours during the day.

Intraday projections of operator requirements to handle the current view of CCS work volume are made by calculating the ratio of cumulative actual CCS work volume to the cumulative estimated CCS work volume. This ratio is then applied to the estimated CCS work volume for each half-hourly period for several hours ahead. In the example illustrated in Table 10-4, the CCS work volume is projected to 2:00 P.M.

Table 10-4
Intraday projections

Operators scheduled		WV-CCS			Projected force status		
Time	**Operators**	**Actual**	**Estimated**	**Projected**	**Revised**	**Available**	**+ or -**
8:30		495	503				
9:00		510	555	Trend			
9:30		610	656	(0.93)			
10:00		725	790				
10:30			998	928	56		
11:00			1062	988	60		
11:30			1015	944	57		
12:00			970	902	55		
12:30			831	773	48		
1:00			782	727	45		
1:30			905	842	51		
2:00			978	909	55		

By 10:00 A.M., the Actual CCS work volume is about seven percent lower than the estimate during the early-morning period. The ratio of actual to estimated CCS work volume (0.93), developed for the 8:00 A.M. to 10:00 A.M. period, is projected for several hours by applying the 0.93 factor to the half-hourly estimates. Operator requirements can then be updated, based on the projected CCS work volumes. The revised operator requirements are obtained by reading the half-hourly projected CCS work volumes into the TOPS MPX half-hourly force capacity table.

5   Comparison of the revised Operators required and the Force available form provides data on which accurate and timely force decisions can be made. The example illustrated in Table 10-5 shows a comparison of the revised Operators required and the Force available form that shows a surplus of four to five operators.

Table 10-5
Operators required and force available

Time	Operators	Actual	Estimated	Projected	Revised	Available	+ or -
8:30						34	
9:00						37	
9:30						43	
10:00						51	
10:30					56	62	+6
11:00					60	66	+6
11:30					57	63	+6
12:00					55	61	+6
12:30					48	53	+5
1:00					45	50	+5
1:30					51	57	+6
2:00					55	61	+6

Half-hourly force data, TOPS MPX - Form FM 48

Form FM 48, Half-Hourly Force Statistics, is used to record information required to administer the force throughout the day. The contents of the DMS output reports (FM30 and FM15) are copied directly and promptly from the FADS or SADS TTY to Form FM 48.

These are the instructions for filling out form FM 48:

1 Columns 1 through 4

   a. The calls (IPS or PS), WV-CCS, average occupied positions (AOP) CCS, and calls-waiting CCS are recorded directly from the FM15 report, obtained each quarter hour at the FADS or SADS TTY.

   b. When AOP must be compared with the number of operators scheduled for a quarter hour period, the occupied positions CCS in column 3 are divided by nine to obtain AOP.

   Note: FM15 reports provide insight into the distribution of WV-CCS within a half hour, particularly during periods of the day when traffic volumes are ascending or descending rapidly. This insight is necessary when preparing basic schedules and in the weekly force estimating process. Special FM15 studies should be scheduled to accumulate the necessary information.

2 Columns 5, 6, 9, 10, 11, and 15 - Calls (IPS or PS), actual WV-CCS, average answer, calls-waiting CCS, AWT, and AOP are recorded directly from the FM30 reports, obtained each half hour at the FADS or SADS TTY.

a. Record in column 5 the number of IPS or PS from the FM30 report. All customer- or outside operator-originated calls that reach a position are included in the count of IPS only. Position reseizures (recalls or coin overtime) and operator-originated delay calls (for example, subsequent attempts, calls to rate and route, calls to the service assistance position, calls to the SOST board) are excluded from the count of IPS. However, if TOPS_PEG_MODE is set to PS, all call types will be represented in the PS (IPS + TPS + RPS) value.

b. Record in column 6 the WV-CCS shown on the FM30 report. This actual WV-CCS, as seen by the DMS, represents the total time (expressed in CCS) that any occupied operator positions were unavailable to handle a new call for any reason. The DMS count of WV-CCS does not include occupied operator positions in the training mode (that is, connected to and working with the training adapter) or maintenance-busy mode.

c. Record in column 9 the average answer shown on the FM30 report. Average answer is calculated each half hour by the DMS and is shown in seconds, correct to one decimal, on the FM30. Average answer represents the total time of subscribers waiting in queue for an operator answer, divided by the number of answered subscribers in the same period of time.

Note: ANS is meaningful as an indicator of speed of answer service for five-hour or six-hour periods. For shorter intervals, ANS is less accurate than WV-CCS. Force requirements must be based on work volumes and the TOPS 04 half-hourly force capacity table to ensure satisfactory speed of answer.

d. Record in column 10 the calls-waiting CCS shown on the FM30 report. Period-of-the-day (that is, 6:00 A.M. - 12:00 noon, noon - 6:00 P.M., 6:00 P.M. - midnight, midnight - 6:00 A.M.) is required for indexing purposes. ANS results are computed by totaling the period-of-the-day sum of IPS or PS and dividing into calls-waiting CCS X 100 (CW-CCS X 100/ IPS or PS). Do not add the various half-hourly average answer entries and divide the total by the number of half hours in the period. This does not yield a correct entry for column 10.

e. Record in column 11 the AWT shown on the FM30 report. AWT, calculated each half hour by the DMS, is shown in seconds, correct to one decimal, on the FM30. AWT represents operator time used to process the average call and do other necessary work. Period-of-the-day (PD) and total-day (TD) AWT may be manually calculated as follows:

- PD AWT = (SUM PD WV-CCS/ 100) / SUM PD IPS or PS.

- TD AWT = (SUM TD WV-CCS/ 100)/ SUM TD IPS or PS.

f. Record in column 15 the AOP shown on the FM30 report. AOP, calculated each half hour by the DMS is shown correct to one decimal. AOP represents the average number of operator positions seen as occupied in the half hour. For example, if 12 operator positions are occupied throughout the first quarter hour, and 14 throughout the second quarter hour, the FM30 report would show AOP 13.0. AOP is the same as board half hours. The DMS count of occupied positions includes any operator position with a headset plugged in to the position headset jacks except positions in the training mode (that is, connected to the training adaptor) or in the maintenance-busy mode.

Note 1: If it is necessary for plant maintenance personnel to use a position headset jack to test a position, the position should be busied from the MAP position.

Note 2: Any headset seated at an operator position in any DMS-initiated maintenance state is excluded from the count of occupied positions or work volume.

3 Column 7 - Estimated WV-CCS: The half-hourly entries in this column are preposted. They are obtained from the weekly volume and force estimate process that utilizes Forms FM 4915 or FM 4915A. The half-hourly estimated WV-CCS in column 7 is the basis for the required operators shown in column 12.

4 Column 8 - Projected WV-CCS: When the estimate of WV-CCS is revised on the basis of a comparison between actual and estimated WV-CCS trends (columns 6 and 7), enter the projected (revised) work volume in this column. Compute a ratio of the trend by dividing accumulated estimated WV-CCS for a period of several half hours into a similar accumulation of actual WV-CCS. Apply the resulting ratio to future half-hourly estimated WV-CCS to factor it up or down. From this projection, use the TOPS MPX half-hourly force capacity table to determine new operator requirements for a period of several hours.

5   Column 12 - Required operators (FM 4915): The half-hourly entries in this column are preposted. They are obtained for each day from Forms FM 4915 or FM 4915A. The number of operators required each half hour is entered in column 12. The half hour may be split into quarter hours so a difference in required operators may be shown, that is, 16/20.

6   Column 13 - Scheduled operators (including excess): The entries in this column are preposted. They represent the actual number of operators expected to be seated at TOPS MPX operator positions each half hour as a result of the scheduling and assignment process. A difference in scheduled operators between quarter hours in any half hour should be shown with an oblique line, that is, 16/20. The number of operators each half hour can be expected to correspond closely to the number in column 12. The number of scheduled operators must include any excess, but does not include absentee replacements or operators to be used for miscellaneous training or other nonoperating activities on a planned basis. In-charge managers should be advised of any scheduled excess so plans may be made to remove this excess, thus maintaining the operator team's work pace at satisfactory levels. In-charge managers must be informed of any unavoidable shortages that would impair customer service.

7   Column 14 - Required operators (for actual WV-CCS): Record the number of operators required as specified by the TOPS MPX half-hourly force capacity table. Obtain the actual work volume CCs from column 6, the AWT from column 11, and use the capacity table to determine required operators (the number that ensures proper balance between objective speed of answer and economy of operation). Use the following sequence:

   a. Enter in column 16 the revised estimate of operators required for future hours, based on the revised (projected) WV-CCS in column 8 and using the TOPS MPX half-hourly force capacity table.

   b. Enter in column 17 the operators available for several hours or longer into the future. The number of half-hourly operators available is obtained by taking the number of scheduled operators (shown in column 13) and updating this figure to reflect the net effect of absentees and absentee replacements as shown at the bottom of Form E-199 or the equivalent.

   c. Enter in column 18 the difference, expressed as a surplus (+) or shortage (-) of operators for the several half hours ahead. Subtract column 16 from column 17, and enter the difference, positive (+) or negative (-) value. For example:

Col 16	Col 17	Col 18
36	38	+2
24	23	-1
41	41	*

8   Column 19: The half hours of the day are preprinted on both sides of Form FM 48 to facilitate accurate lateral reading of data.

9   Column 20 - Standard WV-CCS: This item may be computed for each half hour by multiplying IPS or PS (column 5) by the standard work time (posted in the upper right-hand corner of Form FM 48) and dividing by 100 to convert to standard WV-CCS.

10 Column 21 - Standard board half hours: The standard WV-CCS (column 20) for each half hour is read into the capacity table under the column appropriate for the standard work time, to obtain standard board half hours. Standard board half hours are summed for the total day, divided by two to obtain standard board hours, and posted to Form FM 2580, Daily and Monthly Productivity Report.

Note: The calculation of standard WV-CCS (column 20) and standard board half hours (column 21) should be done for each half hour at the end of the day (next morning) rather than half-hourly throughout the day.

The time that operators spend at TOPS MPX positions answering real calls for training purposes is included in the DMS count of occupied positions and therefore AOP (board half hours). A record of this time, in minutes, must be maintained, summed for the day, and entered at the bottom of Form FM 48, on the line designated "TOTAL DAY MINUTES OF 627-021, 627-031 TIME INCLUDED IN COL 15 (AOP)." This record of time does not include that of operators spent at TOPS MPX positions connected to the training adapters, because this time is not included in AOP.

The the DMS program that accumulates the FM statistics usually scans 180 times each half hour. The actual number of scans is printed on all force management periodic reports. In the unlikely event that the scan count is not 180, the actual scan count on the FM30 report should be noted in the left-hand margin of Form FM 48 beside the half hour affected. The calls-waiting CCS for that half hour should be encircled in column 10. The period-of-the-day computation of average answer should omit IPS or PS and calls-waiting CCS from the affected half hour. Other data on the FM30 report are suspect. The IPS or PS, actual WV-CCS, and AOP may be estimated using previous valid half hours and similar data from the same time and day in previous weeks.

As locally required, a copy of completed Form FM 48 may have to be sent to the service analysis group for independent computation of answer indexes. A local requirement to retain FM30 reports for some period of time, such as one week, may also exist.

Efficiency ratios and measurements

This section describes the efficiency ratios and measurements that are used to indicate trends in the efficiency of customer service. The Daily and Monthly Productivity Report, Form FM 2580, is also described.

This section uses the following industry-standard forms, procedures, or accounting systems:

- Daily Force Record, Form E-200
- Traffic Expense Accounts and Subaccounts (FCC Part 31, Rules and Regulations for the Uniform System of Accounts)
- detailed rules for the accounting and classification of hours included or excluded from efficiency measurements, as they apply in any operator services office
- the supplementary peg count process that equates the local call mix with standard work second allowances to derive a standard work time per call

AWT and SWT

AWT reflects the average operator work time required to handle the average call and do other necessary work. AWT is calculated each half hour by the DMS. AWT can be manually recalculated to obtain the total day value as follows:

- (Total Day Actual WV-CCS/100)/ Total Day IPS or PS

Standard work time (SWT) may be developed by periodically weighting the TOPS MPX average operator standard work seconds, according to the class-of-call volumes in the local TOPS MPX. The SWT so derived may serve as a standard for comparison to the AWT. The SWT includes average allowances for operator inexperience (based on system studies) and other operator busy time such as discussion with an instructor service assistant and other position made-busy time that normally occurs.

Analysis of the traffic in a TOPS MPX is provided through the use of the TOPS 04 traffic sampling feature (TSF), which provides a sample of the toll and local call types reaching the TOPS MPX operator. The TSF provides the operating company with the ability to record on AMA tape "one of n" distinct calls that reach a TOPS MPX position. "One of n" equals the sampling interval. Sampling intervals must be determined in each TOPS MPX for weekdays, Saturdays and Sundays. The TSF removes the requirement for manual traffic sampling studies in TOPS MPX offices.

Speed-of-answer measurement

Over a period of the day or a month, the ANS measurement reflects the promptness with which customer calls are answered. The responsibility for providing consistently prompt speed of answer is combined with the responsibility for controlling costs.

Speed-of-answer results depend on the accuracy of call estimates and the precision of the scheduling process that estimates the exact number of operators required each quarter hour. The number of scheduled operators can require adjustment prior to or within the day in response to changes in work volume trends.

The speed-of-answer service measurement may be improved by increasing the number of operators serving a particular queue. The force management ratios and measurements can assist managers in achieving the proper balance between the quality of service and the cost of operating TOPS MPX.

Operator team efficiency ratio

Operator team efficiency is the ratio of AWT to SWT. The ratio is developed from the following formula:

- SWT/AWT = Operator team efficiency

This comparison can reflect the experience of the operator force, its motivation and skill, the effectiveness of methods, work habits, and training, the equipment used in the offices, and the quality of the toll network with which the TOPS MPX operator interfaces. Individual offices that handle similar traffic during similar hours of operation can be compared through their AWT levels in a TOPS MPX with more than one traffic office.

Schedule efficiency ratio

Schedule efficiency is the ratio between required board hours and the actual (scanned) board hours counted by the DMS. The ratio is developed from the following formula:

- Required board hours/Actual board hours = Schedule efficiency

Required board hours are the board hours that contain the proper ready-to-serve time required to ensure prompt speed of answer. They are developed by reading half-hourly actual WV-CCS and AWT into the TOPS MP half-hourly force capacity table. The sum of the resulting required board half hours at the end of the day (next morning), divided by two, equals required board hours.

The DMS reports average occupied positions (AOP) each half hour, and board hours in the six- and 24-hour (FM6HR and FM24HR) reports.

This schedule efficiency ratio is independent of the SWT. It measures the accuracy with which the operator force was provided based on the half-hourly force capacity table requirements for the actual WV-CCS. It evaluates both the accuracy of work volume estimates and the precision of the scheduling process, as well as the responsiveness to subsequent changes in work volume trends.

The ANS must always be stated with the schedule efficiency ratio (for the same time period) to ensure that the service perspective is fully recognized.

Administrative ratio

Administrative ratio represents the relationship between overall hours and account 624 board hours. This ratio shows the proportion of overhead hours used to administer the TOPS MPX or an individual office within a TOPS MPX to board hours. The formula is as follows:

- Overall Hours/ Account 624 board hours = Administrative ratio

For example, 300 overall hours/ 200 account 624 board hours = 1.33.

Overall hours reflect most operating expenses and consist of the following:

- board hours
- supervisory hours
- relief, clerical, and miscellaneous hours
- initial training hours
- supplementary training hours
- departmental paid hours not on duty
- premium overtime hours

    Note: Hotel Billing and Information Center (HOBIC) hours are included in relief, clerical, and miscellaneous hours.

Operating efficiency measurement

Operating efficiency is the measurement that incorporates the following two concepts:

- the efficiency of the operator force as indicated by the relationship between AWT and SWT
- the efficiency with which the force was scheduled and administered as indicated by the schedule efficiency ratio

Operating efficiency is developed from the following formula:

- (Standard board hours/Actual board hours)/100 = Operating efficiency

Standard board hours are developed as follows:

1 Develop half-hourly standard WV-CCS:
    a. multiply half-hourly IPS or PS by SWT.
    b. divide by 100 to convert to CCS.
2 Use standard WV-CCS in the TOPS MPX half-hourly force capacity table in the column appropriate to the SWT to determine standard board half hours.

3   Divide the sum of standard board half hours by two to produce standard board hours for the total day.

Actual board half hours are scanned by the DMS and reported each half hour as AOP on the FM30. AOP is summed for the day and divided by two to produce total day actual board hours. The actual (scanned) board hours so derived include the occupied position time of operators in training that is spent handling customer calls.

The actual board hours are influenced by an AWT that is less or greater than the SWT and may also reflect a schedule surplus or shortage for the actual work volume offered. When the operator team is working at the system average speed for the local mix of calls, and when the number of operators at positions is the same as that specified by the TOPS MPX half-hourly force capacity table, then the operating efficiency should center around 100.

Overall efficiency measurement

Overall efficiency is the measurement that relates the overall hours of running the TOPS MPX with the standard board hours. The measurement is computed as follows:

-   (Standard board hours/Overall hours)/100 = Overall efficiency

Overall hours reflect most traffic operating expenses, including supervision, relief, clerical, miscellaneous, training, paid absence, and premium overtime hours.

Daily and monthly productivity report - Form FM 2580

The Daily and Monthly Productivity Report, Form FM 2580, is designed to summarize calls, work volumes, and employee hours, and to compute efficiency measurements in TOPS MPX.

Form FM 2580 is basically a calendar month form. Sufficient lines are provided to record weekly and monthly ABD estimates and actual measurements for subsequent transfer to columns on the force program.

The scanned hours recorded by the DMS are used in the efficiency measurements. The time that night operators occupy positions is included in scanned hours. Incidental time spent away from their positions by night operators is reported in miscellaneous hours.

The line and column entries on Form FM 2580 are described in the paragraphs that follow. The data source for several of the columns is Form E-200, the Daily Force Record. This is an industry-standard form that may require individual operating company modification. Forms E-199 and E-201 can serve as a source for entries on Form FM 2580.

1   Date: In this column the dates of the calendar month are entered. The entries for business days, Saturdays, Sundays, and holidays are made under the appropriate headings.

2   Column 1 - Estimated calls: Enter the estimated calls for each day, for subsequent comparison with corresponding actual calls.

3   Column 2 - Actual calls: Obtain this value by totaling the half-hourly count of IPS or PS as recorded on Form FM 48, TOPS MPX half-hourly force data.

4   Columns 3-6 - Use as locally required.

5   Columns 7, 8 - WV-CCS: Enter the estimated and the actual WV-CCS. The total day actual WV-CCS is obtained from Form FM 48, TOPS MPX half-hourly force data.

6   Column 9 - SWT/ AWT: The SWT is developed by company, regional or area staff, who may provide separate figures for weekdays, Saturdays, and Sundays. Obtain the AWT for the total day from Form FM 48, TOPS MPX half-hourly force data, or calculate it by multiplying WV-CCS (Form FM 2580, Column 8) by 100 to convert to seconds and dividing by the total calls (Form FM 2580, Column 2).

7   Column 10 - Estimated board hours: Enter the estimated board hours for the day in this column.

8   Column 11 - Scanned board hours: Enter the total board hours reported by the DMS in the FM24HR report. Scanned board hours are also referred to as actual board hours and they include time spent handling customer calls.

9   Column 12 - Training board hours: Enter the total hours spent handling customer calls at TOPS MPX positions by employees whose time is charged to training. Obtain this value from the entry at the bottom of Form FM 48, TOPS MPX half-hourly force data.

10 Column 13 - Regular board hours: Enter the board hours of employees whose time is charged to regular board hours by deducting training board hours from scanned board hours (Column 11 minus Column 12).

11 Column 14 - Required board hours: Enter the board hours indicated as required by the TOPS MPX half-hourly force capacity table for the actual WV-CCS. Obtain required board hours for the total day from Form FM 48, TOPS MPX half-hourly force data.

12 Column 15 - Standard board hours: Develop standard board hours by multiplying half-hourly IPS or PS values by the SWT and dividing by 100 to produce the standard WV-CCS. Use the standard WV-CCS in the Capacity Table, in the column appropriate for the SWT, to read out standard board half hours. Divide the standard board half hours by two to obtain standard board hours for entry in Column 15.

13 Column 16 - Supervisory hours: Obtain these hours from Form E-201 and the payroll as locally appropriate.

14 Column 17 - Relief, clerical, and miscellaneous hours: Obtain these hours by subtracting the sum of regular board and supervisory hours from the total on duty hours, excluding training (Column 23 minus Columns 13 and 16).

15 Column 18 - Total employees on duty, excluding training: Enter this figure from the appropriate column on Form E-200.

16 Column 19 - Average tour length: This item can be obtained separately for weekdays, Saturdays, and Sundays from the assignment of hours currently in effect. Therefore, it is not an actual tour length, but rather a calculated average tour length based on the schedule in force at the time.

17 Column 20 - Daily overtime hours: Enter these hours from the appropriate column on Form E-200.

18 Column 21 - Excused unpaid hours: These are excused unpaid hours of less than a session. Obtain the daily total from the appropriate column on Form E-200.

19 Column 22 - Travel time (hours) outside of scheduled hours: Record these hours to the extent that they are paid at straight time, on Form E-200 and transfer the value to Column 22.

20 Column 23 - Total on duty hours (paid) in administrative ratio, excluding training: obtain these hours by multiplying total employees on-duty excluding training (Column 18) by the average tour length (Column 19), and then adding overtime hours (Column 20) and travel hours outside of scheduled hours (Column 22).

21 Columns 24, 25 - Training hours, initial and supplementary: Obtain these hours from Form E-199 or from the payroll. Include the relief time of employees charged to the training account.

22 Column 26 - Department paid hours not on duty: Develop these hours from the number of employees recorded as paid absence, incidental, or miscellaneous, on Form E-200. Multiply the number of employees so classified by the number of paid hours in the standard day tour (typically 7.5 or 8.0 hours) to obtain hours for Column 26.

23 Column 27 - Premium overtime hours: Enter these hours based on local procedure. They generally result from daily overtime worked or counted as worked in excess of a full tour, or weekly overtime worked in excess of ten full sessions. Also, a contract can specify premiums for other reasons. In some companies, for example, a rescheduled relief day results in premium payment to the employee. Another example would be special minimum call-in premiums paid in addition to or instead of time paid for hours worked. The premium hours associated with any of these conditions must be calculated and included in the overall hours. Form E-200 and the associated instructions should serve as the source for the calculation of premium hours appropriate in the company.

24 Column 28 - Overall hours: Obtain these hours by adding the entries in Columns 23 through 27.

25 Column 29 - Employees in overall hours: Obtain this entry from Form E-200.

26 Column 30 - Administrative ratio: Enter the ratio of overall hours to board hours. It is obtained by dividing overall hours (Column 28) by regular board hours (Column 13), correct to two decimal places.

27 Column 31 - Operator team efficiency ratio: Develop this ratio by dividing AWT, as recorded daily in Column 9, into the appropriate SWT entered at the top of Column 9, correct to two decimal places.

28 Column 32 - Schedule efficiency ratio: Develop this ratio by dividing scanned board hours (Column 11) into required board hours (Column 14), correct to two decimal places.

29 Column 33 - Operator efficiency: Develop this measurement by dividing scanned board hours (Column 11) into standard board hours (Column 15) and multiplying by 100. Show as an integer value.

30 Column 34 - Overall efficiency: Develop this measurement by dividing overall hours (Column 28) into standard board hours (Column 15) and multiplying by 100. Show as an integer value.

31 Columns 35-38 - Use as locally appropriate.

When summarizing data on Form FM 2580, such as business days, Saturdays, Sundays, holidays, Sat-Sun-Hol or ACD, the following guidelines apply:

1   Add the appropriate daily entries and divide by the number of days for these items: calls, WV-CCS, various statements of board hours, and other classifications of hours including overall hours.

2   Using the formula near the top of each column, recalculate various efficiency measurements and ratios, such as operator team, schedule and administrative ratios, and the operating and overall efficiency measurements. Recalculate the AWT per call by multiplying total WV-CCS (Column 8) by 100 to convert to seconds, then dividing by the total calls (Column 2).

3 Average calendar day (ACD) SWT can be properly weighted as follows:
   a. Total business day calls (calendar month)/ weekday SWT
   b. Total Saturday calls (calendar month) / Saturday SWT
   c. Total Sunday calls (calendar month) / Sunday SWT
   d. Total holiday calls (calendar month) / holiday SWT

4 Add the results of steps 3a through 3d and divide by total calendar month calls.

The following provisions also apply when summarizing Form FM 2580:

- The appropriate SWT per call (weekday, Saturday, or Sunday) is effective for all days of the calendar month.
- ABD is the average for all the business days in the calendar month.
- ACD is the average for each day of the calendar month, except December 25.
- Average Saturday, Sunday, and holiday is the average for the Saturdays, Sundays, and holidays in the calendar month. December 25 is the only holiday excluded from this calculation.

Multitraffic office TOPS MPX

This section describes the administrative principles and procedures that apply to a TOPS MPX with more than one traffic office.

Multitraffic office TOPS MPX force management principles

The large team concept of force administration emphasizes the interdependence of all offices in the TOPS MPX. It requires centralized force administration to maintain all force data. All operators in the traffic offices served by a TOPS MPX constitute a single force administration team, because any call may be distributed to any occupied position.

Large team operation requires less ready-to-serve time in slow hours as well as in busy hours, but introduces the risk of a delicately balanced relationship between work volumes and service. Skillful force management is required to capitalize on these opportunities for large team savings and to maintain a balance between efficiency and service. The efficiency-service relationship must be constantly monitored by analyzing the data provided by the DMS. This monitoring must be performed for the entire TOPS MPX on a centralized basis. This ensures a uniform and complete interpretation of the load-to-service relationship.

A TOPS MPX with more than one traffic office has a single, combined speed of answer measurement. The mutual support of all offices contributing to this measurement is required to ensure consistent and satisfactory customer service. Each traffic office is responsible for

performing at its estimated AWT, and for providing the exact number of operators each half hour as scheduled by the force administrator. Although the AWT is unique for each traffic office, the combined AWT must be predictable in order to estimate the precise number of operators required to achieve the objective speed of answer.

There are advantages inherent in a large TOPS MPX with several constituent traffic offices:

- Large team operation saves operator hours through more efficient utilization of operator time at positions.
- Customer service may be more consistent and is less likely to be subject to long delays during traffic peaks.
- The gathering of large traffic volumes in a single force administration team contributes to more accurate estimates of work volumes to be offered to TOPS MPX.
- Some of the traffic offices may close down during periods of light traffic, and calls are automatically routed to the office(s) that remain open. Administrative hours may thereby be reduced.
- In an emergency, one traffic office may be uncovered, without necessarily impairing customer service.
- The size and location of the various traffic offices may be configured to take advantage of other considerations:
  - the span of control for in-charge managers
  - locations of good labor markets
  - night and weekend work assigned in locations where operators live

A TOPS MPX work force can consist of from one to 30 traffic offices. The number of positions in each office can vary.

The large base of traffic and operator work volumes in a multitraffic office TOPS MPX results in a relatively stable foundation for a basic schedule. Up to 90 percent of the total hours required for the lowest week during the life of the schedule can safely be drawn as basic tours. The remainder can be drawn for each day of the week to fit the operator requirements precisely.

This procedure is compatible with either of the two widely-used operator tour assignment plans:

- fixed basic schedule assignment plan, in which the basic tours are assigned to individuals for the fixed life of the schedule
- open schedule assignment plan, in which all tours are reassigned each week on the basis of seniority choices

The scheduled force must be adjusted to meet changes in the distribution and volume of WV-CCS as the day progresses. By comparing the actual

half-hourly work volume with the estimate on which the schedule for the day is based, force supervisors reassess the half-hourly operator requirements. If necessary, force supervisors request that traffic offices add or subtract operators from positions. By changing the number of operators required in the traffic offices, force administrators can effectively shift work volumes from one office to another as required by the force or positions available in each traffic office.

The traffic office contribution to consistently satisfactory speed of answer can be summarized as follows:

- make accurate AWT estimates for future months, weeks, and days
- ensure that the scheduled number of operators are at positions each half hour and quarter hour
- respond as effectively as possible to requests from the centralized force group to modify the scheduled number of operators

Successful force management in a TOPS MPX with more than one traffic office depends on clearly understood responsibilities and the closest possible cooperation between the centralized force group and the managers in all of the traffic offices. The force supervisor develops schedules that require a minimum of intraday adjustment. The traffic offices must ensure that the scheduled number of operators is available at all times.

Offline computer processing of force administration data may provide more timely force management information.

Call transfer considerations

The call transfer feature enables certain operators to transfer calls to other operators in the same TOPS MPX. The feature can be used at minimal levels, with no formal force provisioning process required for transfer operators (that is, only the overall operator requirements need be identified, knowing that there will always be sufficient transfer operators available). A lower availability of transfer operators might still involve no formal transfer operator half-hourly provisioning process, but rather an administrative system that ensures that there are always some transfer operators available.

The worst situation would be that the number of transfer operators available is so small that a separate half-hourly provisioning process for them is necessary. Such a process would require attention to the number of transfer operators available for each traffic office. Availability may depend on the labor market close to each office, but every attempt should be made to retain a proportionate number of transfer operators in each office.

The minor cost of this additional element of the force management job, along with potential degradation of grade of service and efficiency, must be constantly examined, with alternative solutions being identified and pursued where possible.

Force programs

In the development of a long-range force program for a TOPS MPX with more than one traffic office, the centralized force group is responsible for the following:

- computing estimated board hours, by month, for the TOPS MPX as an entity
- allocating these board hours among the several traffic offices in the TOPS MPX

The development of the force program beyond the allocation of board hours to each office is primarily the responsibility of each traffic office. After each traffic office prepares its own individual force program, the results are consolidated for the system by the force group.

Estimating total board hours for force programs is described in "Force planning" on page 10-7. In a TOPS MPX with more than one traffic office, this process benefits substantially from joint consultations between the force supervisor, the in-charge managers, the facilities manager, and the system manager.

Allocating estimated board hours among the traffic offices is affected by the following factors:

- number of positions provided in each office
- availability of people
- hours of operation
- desired size of each office
- employment market for each office
- special hiring and training programs
- historical data on trends and seasonal fluctuations in work volumes

The number of positions provided in a particular office is a basic physical constraint on the allocation of board hours to that office. Consultation with the facilities manager should determine the minimum surplus of positions that is required to meet emergency position outages for each traffic office. The force group should develop a method (from history or by drawing schedules based on a tentative board hour allocation) of estimating the busy-hour occupied position requirements for any TOPS MPX traffic office.

Weekly force allocation

This section describes the allocation of operator tours for each day of the week after the supplementary or total schedule has been drawn for the TOPS 04 installation. The schedule must be drawn for the total system based on the total half-hourly WV-CCS offered to the TOPS MPX.

Estimates of WV-CCS are translated into half-hourly operator requirements using Form FM 4915 or FM 4915A. This process is described in "Weekly force estimation" on page 10-15.

A schedule is then drawn to fit the required line as closely as possible. Once the specific tours that form the schedule have been selected, the assignment procedure in a single-traffic office TOPS MPX is usually ready. In a TOPS MP with more than one traffic office, a second process is necessary. This process is the schedule allocation procedure that allocates operator tours to individual traffic offices.

The following factors must be considered for each traffic office in the allocation of tours:
- hours of operation
- days of operation
- availability of people
- number of installed positions

The long-range planning that determined the offices' structure can have an appreciable effect on the allocation of tours. Tours are allocated by the force group based on information provided by the traffic offices and tailored to the particular configuration of the TOPS MPX and its operation.

Because of the considerable variety among large team systems, the process described in the following paragraphs outlines general principles and the use of supplementary worksheets that may need to be modified for use in a particular TOPS MPX. Only the tour allocation process is described.

The exchange of information necessary to allocate the tours begins with each traffic office furnishing to the force group the information on the upper three-quarters of the worksheet, called System Operator Requirements (Figure 10-2 on page 10-45).

The identifying information is completed as follows.
- Traffic office: Enter the name or unit number of the traffic office originating the form.
- Week beginning: Enter the month and the date of the Sunday that begins the week for which the process applies.
- Positions installed: Enter the number of positions installed in the office.
- Hours of operation: Enter the hours of operation for week days, Saturdays, and Sundays in the traffic office. If the hours of operation are less than 24, show the hours at which the office opens and closes.

The originating traffic office completes lines 1 through 18 on the worksheet (see Figure 10-2 on page 10-45). The following entries are required:

1   Total operators on payroll: Enter the total number of operators on the payroll excluding leaves of absence, transfers out, and losses on or before Sunday.

2   Operators Eng, Re-Eng, Trans In: Enter the total number of operators added to the force on or before Sunday.

3   Operators borrowed: Enter the total number of operators borrowed from another office for a full week.

4   Total operators on force: Enter the sum of items 1-3.

5   Part-time operators: Enter the total number of part-time operators expected to be on the payroll included in item four.

6   Disability: Enter the total number of operators expected to be on disability benefits.

7   Vacations: Enter the total number of operators expected to be on vacation.

8   E - weeks granted: Enter the number of full weeks of planned excused time.

9   Operators in training - Initial: Enter the number of operators in a full week of initial training.

10 Operators loaned: Enter the number of operators loaned to another office for a full week.

11 Operators unavailable: Enter the number of operators unavailable for a full week. This is the sum of items 5-10.

12 Full time operators available: Enter the total number of full time operators available. This is item 4 minus item 11.

13 Full time operator days: Enter the number of full-time operator days available. This is item 12 / 5.0.

14 Borrows and additions after Sunday: Enter for each day the number of operators borrowed for less than a week, as well as the operators who are added after the first day of the week.

15 Equivalent part-time days available: Enter for each day the equivalent days to be added for part-time operators who are available to work.

16 Loans and losses after Sunday: Enter for each day the number of operators loaned for less than a week, as well as the operators who are losses after the first day of the week.

17 Operator office requirements: Enter for each day the operator requirements for such items as excused days, miscellaneous days, vacation days, disability days, reengaged and transfer-in training days, study days, peg count days, absentee replacement days, employee interview days, and miscellaneous days required by the traffic office.

18 Position days available: Enter the total of the position days available. This is determined by the performing three calculations:

1. Item 13 + item 14 + item 15 = x
2. Item 16 + item 17 = y
3. Position days available = x - y

Note: The centralized force group completes the bottom quarter of the worksheet for each traffic office. Entries 19 through 22 are required.

19 Line 19 - Position days required: Enter the total operators required to handle the estimated work volume each day of the week. This is the sum of basic and supplementary tours. The entry can be made only after the allocation process is completed.

20 Line 20 - Basic: Enter the total basic tours provided each weekday. This entry is posted prior to the schedule allocation. Weekend operator requirements are treated as supplementary tours.

21 Line 21 - Supplementary: Enter the number of supplementary tours is posted for each day after the allocation process is completed.

22 Line 22 - Total days (+ or -): Enter the net difference between position days available (line 18) and position days required (line 19) is entered for the total week, after the allocation process is completed.

Figure 10-2
System operator requirements worksheet

System operator requirements worksheet

Traffic office   _____   Week beginning   _____
Position installed   _____   Hours of operation   _____
                                                                   Business days   _____
                                                                          Saturday   _____
                                                                            Sunday   _____

1. Total operators on payroll (excl. L/A)   _____
2. Operators eng, re-eng, trans in.
3. Operators borrowed (full week)   _____
4. Total operators on force   _____
5. Part-time operators   _____
6. Disability   _____
7. Vacations   _____
8. E-weeks granted   _____
9. Operators in training-initial   _____
10. Operators loaned (full week)   _____
11. Operators unavailable (5 thru 10)   _____
12. FT operators available (4 thru 11)-   _____

                                                              _____

	Sun	Mon	Tue	Wed	Thr	Fri	Sat	Total
13. FT operator days (12/5.0)	-	-	-	-	-	-	-	
14. Borrow/additions after Sun.								
15. Equiv. PT days available								
16. Loans/losses after Sunday								
17. Office requirements								
18. Position days available	-	-	-	-	-	-	-	

Information furnished by force group

	Sun	Mon	Tue	Wed	Thr	Fri	Sat	Total
19. Position days required								
20. Basic								
21. Supplementary								
22. Total days (+ or - (19-18	-	-	-	-	-	-	-	

The actual allocation process is explained in the following paragraphs. An
Operator Tour Schedule Worksheet has been designed for use in a
TOPS MPX with four traffic offices (Figure 10-3 on page 10-48). Under
each day of the week, columns 1-4 are for the traffic office information, and
column 5 is for the total of the four traffic offices. This process is designed
to accommodate a TOPS MPX that rotates the weekend work among the
various traffic offices.

The lines on the upper half of the worksheet are numbered and the operator tour allocation begins by completing the form as follows:

1   Operator position days available: Enter the number of operator position days available from each traffic office as obtained from line 18 on the System Operator Requirements worksheets. Make the entries and add them for the total TOPS MPX under column 5.

2   Operator position days required: Enter the number of operator position days required for the total TOPS MPX under column 5. This figure is the sum of operators required for each day of the week as derived from the Form FM 4915 process and the actual schedules drawn. A comparison of the required system position days with the available position days reveals whether a force surplus or shortage exists. If a force surplus exists, it can be distributed equitably to all offices. If a force shortage exists, decisions must be made as to how the shortage can be relieved and how overtime days are to be allocated among the traffic offices.

3   Basic schedule requirements: Enter the number of tours provided by the basic schedule for each traffic office, Monday through Friday. The weekend basic schedule is left blank because all weekend tours are treated as supplementary tours.

4   Operators available: Enter the number of operator position days available for those traffic offices scheduled to operate on either Saturday and Sunday (or both). The numbers are obtained from line 18 on the System Operator Requirements worksheets. Make the entries under the Sunday and Saturday columns for the particular traffic offices, as appropriate.

5   Operators available percent: The percentages are calculated for each traffic office scheduled to operate on either Sunday and Saturday (or both), based on the percentage of total operators available that each of the offices' operators are available for the particular weekend day.

6   Total supplementary tours: Enter the total number of tours to be scheduled for Sunday and Saturday for the TOPS MPX. These figures are based on the operator schedules that have been drawn by the force group for these days. Make the entry for the total TOPS MPX for operator position days required (line 2) and total supplementary tours (line 6) for both weekend days. The number of weekend tours allocated to each office is obtained by multiplying the percentage that each office comprises of the available force (line 5) by the total TOPS MPX supplementary tours (line 6). Enter this number for each office that is operational on weekends.

Allocate the specific supplementary tours required by type to the weekend offices. Based on the hours of operation, the number of installed positions, and the percent of operators available, allocate the tours to the traffic offices.

Start with the tours that can only be worked by the 24-hour office, until all the tours are equitably distributed to the individual offices.

Repeat the process for both Sunday and Saturday until all the required tours are allocated to the weekend offices. The bottom of the Operator Tour Schedule Allocation worksheet can be used to record the results of this allocation of tours to traffic offices. The total tours allocated to the traffic offices must equal the system total required supplementary tours.

The process of allocating the weekday tour requirements on the Operator Tour Schedule is as follows.

1   Recalculate the operator position days available on an ABD basis by subtracting the weekend requirements from the overall operator position days available for each office and for the total system. Enter these figures for each business day for all offices and the total system.

2   Post the required operator position days for the business days for the total system. These figures represent the end result of the schedules drawn by the force group.

3   Post the number of operator tours provided by the basic schedule for the business days for each office and the total TOPS MPX.

4   Calculate the operators available for each business day by subtracting the number of operator days provided by the basic schedule (line 3) from the operator position days available (line 1). Enter this figure for each office and the total system.

5   Calculate the operators available percentage on an ABD basis by determining the percentage that each offices' available operators are of total operators available. Enter the percentage for each traffic office. Ensure that the percentages total 100 for the system.

6   Enter the total supplementary tours for the system for each business day. Calculate the supplementary tours to be worked in each traffic office by applying the percentage of operators available for each office (line 5) to the total supplementary tours to be assigned to each traffic office each business day.

7   Distribute the specific supplementary tours required for each business day, by type, to the traffic offices. Based on the hours of operation, the number of installed positions, and the percentage of operators available, allocate the tours to the offices. Start with the tours that only the 24-hour office can work, and continue until all the tours required are equitably distributed to the individual offices.

The bottom portion of the Operator Tour Schedule Allocation worksheet can be used to record the results of this allocation process. The total tours allocated to the traffic offices must equal the total supplementary tours required for the system.

Figure 10-3
Operator tour allocation worksheet

		SUN					MON					TUES					WED					THUR					FRI					SAT					TOTAL				
		1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
1	Operator Position Days Available																																									
2	Operator Position Days Required																																									
3	Basic Schedule Requirements																																									
4	Operators Available																																									
5	Operators Available %																																									
6	Total Supp Tours																																									
	Night Supp Tours																																									
	Late SHF Supp Tours																																									
	SHF Supp Tours																																									
	AF Supp Tours																																									
	WF Supp Tours																																									
	MA Supp Tours																																									
	Part-Time Supp Tours																																									
	Force + OR -																																									

Operator tour allocation worksheet

Part-time tours are treated separately and are excluded from this allocation process. Part-time tours are allocated based on each traffic office availability and use of part-time tours.

The force group completes the bottom quarter of the system Operator Requirements worksheet (Figure 10-2 on page 10-45) for each traffic office. This worksheet, along with a listing of the tours to be assigned each day, is returned to the individual traffic offices. These sheets are used to complete the weekly force estimate form and the day-off assignment plan procedure. The traffic offices assign operators to specific tours.

A summary of the step-by-step procedure involved in operator tour allocation follows:

1   Determine operator position days available on a five-day basis to work the full week of seven days.

2   Allocate the weekend operator position days requirements.

3   Recalculate the operator position days available to work the five business days.

4   Subtract the weekday basic schedule requirements.

5   Allocate the weekday supplementary tours to the offices based on the weekday operators available.

The process can be simplified to reduce the steps required for an individual system by tailoring the general principles outlined to fit a specific system's requirements. This manual procedure is similar to a computer-assisted procedure that performs the tour allocation function.

When a basic schedule is prepared for the TOPS MPX, a process that employs principles similar to those described can be used to allocate basic schedule tours among the traffic offices.

Intraday force management

The basic principles and procedures of daily force management are described in "Intraday force projections" on page 10-22. A TOPS MPX with more than one traffic office uses the same principles, but with a shared responsibility for the implementation of intraday decisions.

The force supervisor plans the operator tour schedule and the necessary revisions to that schedule as the day unfolds. The data recorded on Form FM 48 show the total system status and determine the need for intraday force adjustments. A comparison of the projected force requirements against the force available indicates the direction and magnitude of intraday force decisions.

The in-charge managers determine the availability of operators. Traffic offices must keep the force administrators informed concerning changes in

the number of operators available for future half hours in the day and for future days. Each traffic office must maintain a daily force memorandum as its source of information concerning the net effect of absentees and replacements in its office.

Form FM 49 is a Half-Hourly Force Projection Worksheet that would be used by the force group in a TOPS MPX with seven traffic offices. Systems with a smaller or larger number of traffic offices may wish to redraft the form to reflect their particular configuration. The data recorded on Form FM 49 expand the total system data to show individual traffic office information so that intraday decisions can be made and relayed to the offices for implementation. Average occupied positions (AOP) can also be recorded for each of the traffic offices each half hour. The source of this information is the FM30 report printed at the FADS TTY.

Form FM 50, Force Data By Traffic Office, is used in a TOPS MPX with seven traffic offices. Data are recorded half-hourly for each traffic office. The source of this information is the FM30 Report printed at the TADS TTY.

Form FM 51, Traffic Office Force Data, is used to record the essential force management statistics for the individual traffic offices for each half hour. These statistics contain the following information:

- operators originally scheduled (by the force group)
- operators currently available (from the daily force memorandum)
- revised operators required (as indicated by the force group)
- the plus or minus condition apparent from a comparison of operators available to operators scheduled or subsequently required, so that the original schedule can be revised for future half hours
- the AOP (from the TO30 Report)
- the final positive (+) or negative (-) condition obtained by comparing the AOP with the last projected or required number of operators.

The in-charge manager should try to maintain the AOP equal to the final projected (required) line.

Form FM 51, Traffic Office Force Data, also should be used to record half-hourly AWT, IPS or PS, and WV-CCS. This information is obtained from the TO30 Report. IPS or PS and WV-CCS must be recorded half-hourly so the period-of-the-day and total day AWT can be recalculated as follows:

  - PD AWT = (SUM PD WV-CCS/100)/ SUM PD IPS or PS.
  - TD AWT = (SUM TD WV -CCS/100)/ SUM TD IPS or PS.

Appendix:
Queue length threshold tables

Queue lengths for call waiting (CW) on, CW off, and call deflection are determined by the following formulas:

D = deflection threshold in seconds
A = average answer time
$\overline{X}$ = AWT
n = the number of calls in queue (The equation is solved to find this value.)
T = team size

CWon n $\quad = \dfrac{2 \bullet A \bullet T}{\overline{X}}$

CWoff n $\quad = \dfrac{A \bullet T}{\overline{X}}$

Deflection n $\quad = \dfrac{D \bullet T}{\overline{X}}$

The following example uses these formulas. The values are taken from Table 11-1, at the row for 29 to 30 operators.

CWon $\quad = \dfrac{2 \bullet 2.1 \text{ seconds} \bullet 30 \text{ operators}}{15 \text{ seconds/call/operator}}$

CWoff $\quad = \dfrac{2.1 \text{ seconds} \bullet 30 \text{ operators}}{15 \text{ seconds/call/operator}}$

Deflection $\quad = \dfrac{30 \text{ seconds} \bullet 30 \text{ operators}}{15 \text{ seconds/call/operator}}$

Note: The call deflection formula is valid for team sizes greater than 7. At the lower end of the range, call deflections are set higher than the formula provides. There would be too much call deflection if the smallest teams were to deflect all calls in queue longer than 30 seconds.

Chapter 3, "Understanding how the DMS distributes calls," explains how the DMS uses queue length thresholds to determine when calls are deflected. For a complete explanation, see the section "Thresholds for call deflect" on page 3-10.

For specific queue thresholds, refer to the following examples of queue threshold tables. Tables 11-1 through 11-18 define thresholds for an ANS of 2.1 seconds, as used with TA calls. Tables 11-19 through 11-20 define thresholds for an ANS of 5.0 seconds, as used with DA calls.

Table 11-1
TOPS MPX queue length threshold table - ANS 2.1, AWT 15 seconds

| OPRANGE | | CW indicator | | Calls |
From	To	Off	On	deflected at
1	2	0	1	19
3	4	0	1	19
5	6	0	1	19
7	8	1	2	19
9	10	1	3	19
11	12	2	3	23
13	14	2	4	27
15	16	2	4	31
17	18	2	5	35
19	20	3	5	39
21	22	3	6	43
23	24	3	6	47
25	26	3	7	51
27	28	4	7	55
29	30	4	8	59
31	32	4	8	63
33	40	5	10	73
41	48	6	12	89
49	56	7	14	105
57	64	8	16	121
65	72	9	18	137
73	80	10	20	153
81	88	11	23	169
89	96	12	25	185
97	104	13	27	201
105	120	15	30	225
121	136	17	34	257

-continued-

Table 11-1
TOPS MPX queue length threshold table - ANS 2.1, AWT 15 seconds
(continued)

| OPRANGE | | CW indicator | | Calls |
From	To	Off	On	deflected at
137	152	19	39	289
153	168	21	43	321
169	184	24	47	353
185	200	26	51	385
201	216	28	56	417
217	232	30	60	449
233	248	32	64	481
249	264	34	68	513
265	280	36	73	545
281	296	38	77	577
297	312	42	83	623
313	328	46	91	683
329	344	50	99	743
345	360	54	107	803
361	376	58	115	863
377	392	62	123	923
393	408	66	131	983
409	424	70	139	1043
425	440	74	147	1103
441	456	78	156	1167
End				

Table 11-2
TOPS MPX queue length threshold table - ANS 2.1, AWT 20 seconds

OPRANGE		CW indicator		Calls
From	**To**	**Off**	**On**	**deflected at**
1	2	0	1	16
3	4	0	1	16
5	6	0	1	16
7	8	1	2	16
9	10	1	2	16
11	12	1	3	19
13	14	2	3	23
15	16	2	3	26
17	18	2	4	29
19	20	2	4	33
21	22	2	5	36
23	24	3	5	36
25	26	3	6	39
27	28	3	6	43
29	30	3	7	46
31	32	4	7	49
33	40	4	8	53
41	48	5	10	61
49	56	6	12	74
57	64	7	13	88
65	72	8	15	101
73	80	9	17	114
81	88	9	19	128
89	96	10	21	154
97	104	11	22	168
105	120	13	25	188
121	136	14	29	214
137	152	16	32	241
153	168	18	36	268
169	184	20	39	294
185	200	21	43	321
201	216	23	46	348
217	232	25	50	374
233	248	27	53	401
249	264	29	57	428

Table 11-3
TOPS MPX queue length threshold table - ANS 2.1, AWT 25 seconds

| OPRANGE | | CW indicator | | Calls |
From	To	Off	On	deflected at
1	2	0	1	12
3	4	0	1	12
5	6	0	1	12
7	8	0	1	12
9	10	1	2	12
11	12	1	2	15
13	14	1	2	18
15	16	1	3	20
17	18	2	3	23
19	20	2	3	25
21	22	2	4	28
23	24	2	4	31
25	26	2	4	33
27	28	2	5	36
29	30	3	5	38
31	32	3	5	41
33	40	3	6	48
41	48	4	8	58
49	56	5	9	68
57	64	5	11	79
65	72	6	12	89
73	80	7	13	100
81	88	7	15	110
89	96	8	16	121
97	104	9	17	131
105	120	10	20	147
121	136	11	22	168
137	152	13	25	188
153	168	14	28	209
169	184	15	31	230
185	200	17	33	251
201	216	18	36	272
217	232	20	39	293
233	248	21	42	314
249	264	22	45	335

Table 11-4
TOPS MPX queue length threshold table - ANS 2.1, AWT 30 seconds

| OPRANGE | | CW indicator | | Calls |
From	To	Off	On	deflected at
1	2	0	1	10
3	4	0	1	10
5	6	0	1	10
7	8	0	1	10
9	10	0	1	10
11	12	1	2	12
13	14	1	2	14
15	16	1	2	17
17	18	1	3	19
19	20	1	3	21
21	22	2	3	23
23	24	2	3	25
25	26	2	4	27
27	28	2	4	29
29	30	2	4	32
31	32	2	5	34
33	40	3	5	39
41	48	3	6	48
49	56	4	8	56
57	64	4	9	65
65	72	5	10	73
73	80	5	11	82
81	88	6	12	91
89	96	7	13	99
97	104	7	14	108
105	120	8	16	121
121	136	9	18	138
137	152	10	21	155
153	168	11	23	172
169	184	13	25	189
185	200	14	28	206
201	216	15	30	223
217	232	16	32	241
233	248	17	34	258
249	264	18	37	275

Table 11-5
TOPS MPX queue length threshold table - ANS 2.1, AWT 35 seconds

OPRANGE		CW indicator		Calls
From	To	Off	On	deflected at
1	2	0	1	9
3	4	0	1	9
5	6	0	1	9
7	8	0	1	9
9	10	0	1	9
11	12	0	1	10
13	14	1	2	12
15	16	1	2	14
17	18	1	2	16
19	20	1	2	18
21	22	1	3	20
23	24	1	3	21
25	26	2	3	23
27	28	2	3	25
29	30	2	4	27
31	32	2	4	29
33	40	2	4	33
41	48	3	5	40
49	56	3	6	48
57	64	4	7	55
65	72	4	8	62
73	80	5	9	70
81	88	5	10	77
89	96	6	11	84
97	104	6	12	91
105	120	7	14	102
121	136	8	16	117
137	152	9	18	131
153	168	10	19	146
169	184	11	21	160
185	200	12	23	175
201	216	13	25	190
217	232	14	27	204
233	248	15	29	219
249	264	16	31	233

Table 11-6
TOPS MPX queue length threshold table - ANS 2.1, AWT 40 seconds

OPRANGE		CW indicator		Calls
From	To	Off	On	deflected at
1	2	0	1	8
3	4	0	1	8
5	6	0	1	8
7	8	0	1	8
9	10	0	1	8
11	12	0	1	9
13	14	1	1	11
15	16	1	2	12
17	18	1	2	14
19	20	1	2	15
21	22	1	2	17
23	24	1	2	19
25	26	1	3	20
27	28	1	3	22
29	30	2	3	23
31	32	2	3	25
33	40	2	4	29
41	48	2	5	35
49	56	3	6	41
57	64	3	6	48
65	72	4	7	54
73	80	4	8	60
81	88	4	9	67
89	96	5	10	73
97	104	5	11	79
105	120	6	12	89
121	136	7	14	101
137	152	8	15	114
153	168	8	17	127
169	184	9	19	139
185	200	10	20	152
201	216	11	22	165
217	232	12	24	177
233	248	13	25	190
249	264	14	27	203

Table 11-7
TOPS MPX queue length threshold table - ANS 2.1, AWT 45 seconds

OPRANGE		CW indicator		Calls
From	To	Off	On	deflected at
1	2	0	1	7
3	4	0	1	7
5	6	0	1	7
7	8	0	1	7
9	10	0	1	7
11	12	0	1	8
13	14	0	1	9
15	16	1	1	11
17	18	1	2	12
19	20	1	2	14
21	22	1	2	15
23	24	1	2	16
25	26	1	2	18
27	28	1	3	19
29	30	1	3	21
31	32	1	3	22
33	40	2	3	25
41	48	2	4	31
49	56	2	5	37
57	64	3	6	42
65	72	3	6	48
73	80	4	7	53
81	88	4	8	59
89	96	4	9	65
97	104	5	9	70
105	120	5	10	78
121	136	6	12	90
137	152	7	13	101
153	168	7	15	112
169	184	8	16	123
185	200	9	18	134
201	216	10	19	145
217	232	10	21	157
233	248	11	22	168
249	264	12	24	179

Table 11-8
TOPS MPX queue length threshold table - ANS 2.1, AWT 50 seconds

OPRANGE		CW indicator		Calls
From	To	Off	On	deflected at
1	2	0	1	2
3	4	0	1	4
5	6	0	1	5
7	8	0	1	5
9	10	0	1	6
11	12	0	1	7
13	14	0	1	8
15	16	0	1	10
17	18	0	1	11
19	20	1	2	12
21	22	1	2	13
23	24	1	2	15
25	26	1	2	16
27	28	1	2	17
29	30	1	2	18
31	32	1	3	20
33	40	2	3	23
41	48	2	4	28
49	56	2	4	33
57	64	3	5	38
65	72	3	6	43
73	80	3	6	48
81	88	4	7	53
89	96	4	8	58
97	104	4	8	63
105	120	5	9	70
121	136	5	11	80
137	152	6	12	90
153	168	7	13	100
169	184	7	15	110
185	200	8	16	120
201	216	9	17	130
217	232	9	19	140
233	248	10	20	150
249	264	11	21	161

Table 11-9
TOPS MPX queue length threshold table - ANS 2.1, AWT 55 seconds

OPRANGE		CW indicator		Calls
From	To	Off	On	deflected at
1	2	0	1	5
3	4	0	1	5
5	6	0	1	5
7	8	0	1	5
9	10	0	1	5
11	12	0	1	7
13	14	0	1	8
15	16	0	1	9
17	18	0	1	10
19	20	0	1	11
21	22	1	2	12
23	24	1	2	13
25	26	1	2	14
27	28	1	2	16
29	30	1	2	17
31	32	1	2	18
33	40	1	3	21
41	48	2	3	25
49	56	2	4	30
57	64	2	5	34
65	72	3	5	39
73	80	3	6	43
81	88	3	6	48
89	96	3	7	52
97	104	4	8	57
105	120	4	8	64
121	136	5	10	73
137	152	5	11	82
153	168	6	12	91
169	184	7	13	100
185	200	7	15	109
201	216	8	16	118
217	232	8	17	127
233	248	9	18	136
249	264	10	19	145

Table 11-10
TOPS MPX queue length threshold table - ANS 2.1, AWT 60 seconds

| OPRANGE | | CW indicator | | Calls |
From	To	Off	On	deflected at
1	2	0	1	5
3	4	0	1	5
5	6	0	1	5
7	8	0	1	5
9	10	0	1	5
11	12	0	1	6
13	14	0	1	7
15	16	0	1	8
17	18	0	1	9
19	20	0	1	10
21	22	0	1	11
23	24	1	2	12
25	26	1	2	13
27	28	1	2	14
29	30	1	2	15
31	32	1	2	16
33	40	1	3	19
41	48	2	3	23
49	56	2	4	27
57	64	2	4	31
65	72	2	5	35
73	80	3	5	40
81	88	3	6	44
89	96	3	6	48
97	104	3	7	52
105	120	4	8	58
121	136	4	9	66
137	152	5	10	75
153	168	6	11	83
169	184	6	12	91
185	200	7	13	100
201	216	7	14	108
217	232	8	15	116
233	248	8	17	124
249	264	9	18	133

Table 11-11
TOPS MPX queue length threshold table - ANS 2.1, AWT 65 seconds

| OPRANGE | | CW indicator | | Calls |
From	To	Off	On	deflected at
1	2	0	1	5
3	4	0	1	5
5	6	0	1	5
7	8	0	1	5
9	10	0	1	5
11	12	0	1	5
13	14	0	1	6
15	16	0	1	7
17	18	0	1	8
19	20	0	1	9
21	22	0	1	10
23	24	0	1	11
25	26	1	2	12
27	28	1	2	13
29	30	1	2	14
31	32	1	2	15
33	40	1	2	17
41	48	1	3	21
49	56	2	3	25
57	64	2	4	29
65	72	2	4	33
73	80	2	5	36
81	88	3	5	40
89	96	3	6	44
97	104	3	6	48
105	120	4	7	54
121	136	4	8	61
137	152	5	9	69
153	168	5	10	76
169	184	6	11	84
185	200	6	12	92
201	216	7	13	99
217	232	7	14	107
233	248	8	15	115
249	264	8	16	122

Table 11-12
TOPS MPX queue length threshold table - ANS 2.1, AWT 70 seconds

OPRANGE		CW indicator		Calls
From	To	Off	On	deflected at
1	2	0	1	4
3	4	0	1	4
5	6	0	1	4
7	8	0	1	4
9	10	0	1	4
11	12	0	1	5
13	14	0	1	6
15	16	0	1	7
17	18	0	1	8
19	20	0	1	9
21	22	0	1	9
23	24	0	1	10
25	26	1	2	11
27	28	1	2	12
29	30	1	2	13
31	32	1	2	14
33	40	1	2	16
41	48	1	3	20
49	56	2	3	23
57	64	2	4	27
65	72	2	4	30
73	80	2	5	34
81	88	2	5	37
89	96	3	5	41
97	104	3	6	44
105	120	3	7	50
121	136	4	8	57
137	152	4	9	64
153	168	5	9	71
169	184	5	10	78
185	200	6	11	85
201	216	6	12	92
217	232	7	13	99
233	248	7	14	106
249	264	8	15	113

Table 11-13
TOPS MPX queue length threshold table - ANS 2.1, AWT 75 seconds

| OPRANGE | | CW indicator | | Calls |
From	To	Off	On	deflected at
1	2	0	1	4
3	4	0	1	4
5	6	0	1	4
7	8	0	1	4
9	10	0	1	4
11	12	0	1	5
13	14	0	1	6
15	16	0	1	6
17	18	0	1	7
19	20	0	1	8
21	22	0	1	9
23	24	0	1	10
25	26	0	1	10
27	28	1	2	11
29	30	1	2	12
31	32	1	2	13
33	40	1	2	15
41	48	1	2	18
49	56	1	3	22
57	64	2	3	25
65	72	2	4	28
73	80	2	4	31
81	88	2	5	35
89	96	3	5	38
97	104	3	6	41
105	120	3	6	46
121	136	4	7	53
137	152	4	8	59
153	168	4	9	66
169	184	5	10	73
185	200	5	11	79
201	216	6	11	86
217	232	6	12	92
233	248	7	13	99
249	264	7	14	105

Table 11-14
TOPS MPX queue length threshold table - ANS 2.1, AWT 80 seconds

OPRANGE		CW indicator		Calls
From	To	Off	On	deflected at
1	2	0	1	4
3	4	0	1	4
5	6	0	1	4
7	8	0	1	4
9	10	0	1	4
11	12	0	1	4
13	14	0	1	5
15	16	0	1	6
17	18	0	1	7
19	20	0	1	8
21	22	0	1	8
23	24	0	1	9
25	26	0	1	10
27	28	0	1	11
29	30	1	2	11
31	32	1	2	12
33	40	1	2	14
41	48	1	2	17
49	56	1	3	20
57	64	2	3	23
65	72	2	4	26
73	80	2	4	29
81	88	2	4	33
89	96	2	5	36
97	104	3	5	39
105	120	3	6	43
121	136	3	7	49
137	152	3	7	56
153	168	4	8	62
169	184	5	9	68
185	200	5	10	74
201	216	5	11	80
217	232	6	12	86
233	248	6	12	93
249	264	7	13	99

Table 11-15
TOPS MPX queue length threshold table - ANS 2.1, AWT 85 seconds

OPRANGE		CW indicator		Calls
From	To	Off	On	deflected at
1	2	0	1	3
3	4	0	1	3
5	6	0	1	3
7	8	0	1	3
9	10	0	1	3
11	12	0	1	4
13	14	0	1	5
15	16	0	1	6
17	18	0	1	6
19	20	0	1	7
21	22	0	1	8
23	24	0	1	8
25	26	0	1	9
27	28	0	1	10
29	30	0	1	11
31	32	1	2	11
33	40	1	2	13
41	48	1	2	16
49	56	1	3	19
57	64	1	3	22
65	72	2	3	25
73	80	2	4	28
81	88	2	4	31
89	96	2	4	33
97	104	2	5	36
105	120	3	5	41
121	136	3	6	46
137	152	3	7	52
153	168	4	8	58
169	184	4	9	64
185	200	5	9	70
201	216	5	10	75
217	232	5	11	81
233	248	6	12	87
249	264	6	12	93

Table 11-16
TOPS MPX queue length threshold table - ANS 2.1, AWT 90 seconds

OPRANGE From	To	CW indicator Off	On	Calls deflected at
1	2	0	1	3
3	4	0	1	3
5	6	0	1	3
7	8	0	1	3
9	10	0	1	3
11	12	0	1	4
13	14	0	1	5
15	16	0	1	5
17	18	0	1	6
19	20	0	1	7
21	22	0	1	7
23	24	0	1	8
25	26	0	1	9
27	28	0	1	9
29	30	0	1	10
31	32	0	1	11
33	40	1	2	12
41	48	1	2	15
49	56	1	2	18
57	64	1	3	21
65	72	2	3	23
73	80	2	3	26
81	88	2	4	29
89	96	2	4	32
97	104	2	5	34
105	120	3	5	38
121	136	3	6	44
137	152	3	7	49
153	168	4	7	55
169	184	4	8	60
185	200	4	9	66
201	216	5	9	71
217	232	5	10	77
233	248	5	11	82
249	264	6	12	87

Table 11-17
TOPS MPX queue length threshold table - ANS 2.1, AWT 95 seconds

OPRANGE		CW indicator		Calls
From	To	Off	On	deflected at
1	2	0	1	3
3	4	0	1	3
5	6	0	1	3
7	8	0	1	3
9	10	0	1	3
11	12	0	1	4
13	14	0	1	4
15	16	0	1	5
17	18	0	1	6
19	20	0	1	6
21	22	0	1	7
23	24	0	1	8
25	26	0	1	8
27	28	0	1	9
29	30	0	1	10
31	32	0	1	10
33	40	1	2	12
41	48	1	2	14
49	56	1	2	17
57	64	1	3	20
65	72	1	3	22
73	80	2	3	25
81	88	2	4	27
89	96	2	4	30
97	104	2	4	32
105	120	2	5	36
121	136	3	6	41
137	152	3	6	47
153	168	3	7	52
169	184	4	8	57
185	200	4	8	62
201	216	4	9	67
217	232	5	10	72
233	248	5	10	78
249	264	6	11	83

Table 11-18
TOPS MPX queue length threshold table - ANS 2.1, AWT 100 seconds

| OPRANGE | | CW indicator | | Calls |
From	To	Off	On	deflected at
1	2	0	1	3
3	4	0	1	3
5	6	0	1	3
7	8	0	1	3
9	10	0	1	3
11	12	0	1	4
13	14	0	1	4
15	16	0	1	5
17	18	0	1	5
19	20	0	1	6
21	22	0	1	7
23	24	0	1	7
25	26	0	1	8
27	28	0	1	8
29	30	0	1	9
31	32	0	1	10
33	40	0	1	11
41	48	1	2	14
49	56	1	2	16
57	64	1	2	19
65	72	1	3	21
73	80	2	3	23
81	88	2	3	26
89	96	2	4	28
97	104	2	4	31
105	120	2	5	34
121	136	3	5	39
137	152	3	6	44
153	168	3	7	49
169	184	4	7	54
185	200	4	8	59
201	216	4	9	64
217	232	5	9	69
233	248	5	10	74
249	264	5	10	79

Table 11-19
TOPS MPX queue length threshold table - ANS 5.0, AWT 20 seconds

| OPRANGE | | CW indicator | | Calls |
From	To	Off	On	deflected at
1	2	1	2	3
3	4	1	3	6
5	6	2	4	9
7	8	2	5	12
9	10	3	6	15
11	12	3	7	18
13	14	4	8	21
15	16	4	9	24
17	18	5	10	27
19	20	5	11	30
21	22	6	12	33
23	24	6	13	36
25	26	7	14	39
27	28	7	15	42
29	30	8	16	45
31	32	8	17	48
33	40	10	21	60
41	48	12	25	72
49	56	14	29	84
57	64	16	33	96
65	72	18	37	108
73	80	20	41	120
81	88	22	45	132
89	96	24	49	144
97	104	26	53	156
105	120	30	61	180
121	136	34	69	204
137	152	38	77	228
153	168	42	85	252
169	184	46	93	276
185	200	50	101	300
201	216	54	109	324
217	232	58	117	348
233	248	62	125	372
249	264	66	133	396

Table 11-20
TOPS MPX queue length threshold table - ANS 5.0, AWT 100 seconds

OPRANGE		CW indicator		Calls
From	To	Off	On	deflected at
1	2	0	1	2
3	4	0	1	2
5	6	0	1	2
7	8	0	1	2
9	10	1	2	3
11	12	1	2	4
13	14	1	2	4
15	16	1	2	5
17	18	1	2	5
19	20	1	3	6
21	22	1	3	7
23	24	1	3	7
25	26	1	3	8
27	28	1	3	8
29	30	2	4	9
31	32	2	4	10
33	40	2	5	12
41	48	2	5	14
49	56	3	6	17
57	64	3	7	19
65	72	4	8	22
73	80	4	9	24
81	88	4	9	26
89	96	5	10	29
97	104	5	11	31
105	120	6	13	36
121	136	7	14	41
137	152	8	16	46
153	168	8	17	50
169	184	9	19	55
185	200	10	21	60
201	216	11	22	65
217	232	12	24	70
233	248	12	25	74
249	264	13	27	79

List of terms

Access (ACS)

Header displayed at all in-charge positions and at the FMCRT. Indicates that a loop has been seized by an operator, and neither calling nor called party is attached. Query capabilities at the in-charge position may be used to determine the operator IDs associated with this condition.

ACD

Automatic call distribution

ACS

Access

AMA

Automatic message accounting

ANI

Automatic number identification

ANIF

Automatic number identification failure

ANS

Average speed of answer

AOP

Average occupied positions

AOPIDLT

Average occupied position idle time

AOPWV

Average occupied position work volume

Assistance position

See service assistance (SA) position.

Automatic call distribution (ACD)

System of distributing calls to operator queues in TOPS, distinguished from Queue Management System (QMS). TOPS ACD system has 9 queues to which calls can be distributed; QMS has 255 queues.

Automatic message accounting (AMA)

An automatic recording system that documents all the necessary billing data for long distance calls.

Automatic number identification (ANI)

A system that automatically identifies a calling number and transmits the number to the automatic message accounting (AMA) equipment billing.

Automatic number identification failure (ANIF)

The situation in which the number identification of the calling station fails.

Average occupied positions (AOP)

The average number of positions occupied over a measured period of time. This is calculated by dividing the work volume plus idle time by the time period. For TOPS ACD, work volume and idle time are measured at the end of the occurrence. For QMS, an audit is done at the end of each measured period, and work volume and idle time are measured for that period rather than at the end of the occurrence. (When the measured period of time is 30 minutes, AOP is equivalent to board half hours.)

Average occupied position idle time (AOPIDLT)

The average time an operator spends at the position, waiting for a call to arrive. This is a QMS measurement based on an audit performed at the end of a measured period of time.

Average occupied position work volume (AOPWV)

The average time that occupied operator positions are handling calls or are otherwise unavailable to handle new calls during a measured period. This is a QMS measurement based on an audit performed at the end of a measured period of time.

Average speed of answer (ANS)

The number of seconds that the average call waits for position attachment during a given period. The average amount of time it took for an operator to answer a call from a particular queue. The total call waiting time associated with a queue, divided by the total number of position seizures associated with the queue. The formula for ANS is CW-CCS/PS.

Average work time (AWT)

The time in seconds required to handle the average call (including all operator unavailable time). The calculation for TOPS ACD is CBWV+NCWV CCS/IPS. The calculation for QMS TOPS is

CBWV/(IPS+RPS+TPS). QMS basic statistics do not use NCWV to figure AWT.

AWT

Average work time

BC

Bellcore

BCFMT

Bellcore AMA format

BDH

Board hours

Bellcore (BC)

Bell Communications Research

Bellcore AMA format (BCFMT)

The format of the output AMA recording data, as specified by Bellcore.

Bell Communications Research (Bellcore)

The independent research agency for the BOC.

Bell operating company (BOC)

See Operating company

Board half hours

The average number of occupied positions during the half hour. Board half hours are the same as AOP.

Board hours (BDH)

The total average number of occupied positions during two half hours. In other words, the average number of occupied positions during the hour. This information is not available as part of QMS basic statistics, but must be manually calculated.

BOC

Bell operating company

Call and agent manager (CAM)

Module of QMS that stores call agent queues and queue priorities and allocates and manages the call and agent resources according to instructions from the call processing applications module of QMS.

Call-busy work volume (CBWV)

Work volume generated when an occupied position is handling a call (that is, the total amount of time an operator spends actively handling a call). For

TOPS ACD, CBWV is pegged against the transfer type of the call (GEN, XFR1, or XFR2). System (SYST) total work volume includes CBWV plus NCWV. For TOPS QMS, work volume is pegged against both a service and a queue.

Call processing cluster

A group of keys containing a dial pad, standard call processing hardkeys, and customer-definable keys.

Call processing hardkeys

Keys used to perform the most frequent call processing activities.

Calls deflected (CD)

The threshold at which calls are routed to treatment instead of placed in queue. When this threshold is reached, a calls-deflected indicator is displayed at the FMCRT and in-charge positions. For TOPS ACD, the message CD is associated with the General queue and each active transfer queue. For TOPS QMS, the indicator QCD is associated with all queues, and a system query is required to determine which queues are affected.

Calls-waiting (CW)

The total amount of time that subscribers wait for attachment to an operator position. In TOPS ACD, the message CW appears on administrative screens to indicate impending or existing traffic overloads, if the parameter TOPS_DISPLAY_CW in Table OFCVAR is datafilled as yes. In TOPS QMS, the calls-waiting display message is QCW.

Calls-waiting hundred call seconds (CW-CCS)

Calls-waiting time, expressed in hundred call seconds.

Calls-waiting queue

The queues to which calls are sent when no idle operator position is available. A call is time-stamped when it is placed in a calls-waiting queue, ringing is applied, and the call waits in the queue until an operator is available.

CAM

Call and agent manager

CAMA

Centralized automatic message accounting

Capacity table

Tables used to read in actual work volume CCS along with AWT, and read out the required number of operators.

Cathode-ray tube (crt)

> A video display terminal.

CBWV

> Call-busy work volume

CCS (hundred call seconds)

> A unit of time equal to 100 seconds.

CCS per board hour

> A total day calculated value for use in force programs (total day work volume CCS divided by total day board hours).

CD

> Calls deflected

Central office (CO)

> A switching office arranged for terminating subscriber lines and provided with switching equipment and trunks for establishing connections to and from other switching offices. Synonymous with class 5 office, end office, and local office.

Centralized automatic message accounting (CAMA)

> A system that produces itemized billing details for subscriber-dialed long distance calls. Details are recorded at a central facility serving a number of exchanges. In exchanges not equipped for automatic number identification, calls are routed to a CAMA operator who obtains the calling number and keys it into the computer for billing.

CI

> Command interpreter

Command interpreter (CI)

> A support operating system component that functions as the main interface between machine and user. Its principal roles are:

> 1   to read lines entered by a terminal user
> 2   to break each line into recognizable units
> 3   to analyze the units
> 4   to recognize command item-numbers on the input lines
> 5   to invoke these commands

Controlled traffic (CT)

> Call distribution based on a limited set of calls. For TOPS ACD, controlled traffic is based on the fifteen call types from the force management reports. For TOPS QMS, controlled traffic is based on a maximum of 126 defined call categories. The CT display on the in-charge position and FMCRT shows

the number of positions occupied by operators who have been placed in controlled traffic mode.

crt

Cathode-ray tube

CT

Controlled traffic

Customer-definable key

Hardkeys used to perform call processing functions that are defined by the customer.

CW

Calls-waiting

CW-CCS

Calls-waiting CCS

DA

Directory assistance

Data modification order (DMO)

A procedure to change operating company data.

Dial pad

A 0-9 numeric keypad used to enter numeric information at the TOPS positions.

Digital multiplex system (DMS)

A central office switching system in which all external signals are converted to digital data and stored in assigned time slots. Switching is performed by reassigning the original time slots.

Directory assistance (DA)

Telephone company information service; operators help callers who cannot find the telephone numbers they wish to call.

DMO

Data modification order

DMS

Digital multiplex system

FADS

Force administration data system

FADS TTY

Force administration data system teletypewriter

Fault Tolerant (FT) Gateway

The NT Power 6/40 FT Gateway computers access the DA and intercept applications. The FT Gateway supports Universal Gateway/Position Message Protocol (UMP).

FIFO

First in, first out

First in, first out (FIFO)

Order in which calls are routed to the calls-waiting queue.

Flat rate (1FR)

A service-related telephony feature that, for a fixed monthly charge, permits an unlimited number of completed calls from a local noncoin line to a group of specified destinations. This group is referred to as a flat rate area, and is usually located within a geographic boundary surrounding the central office. Two or more flat rate areas may be specified for a central office with some destinations assigned to more than one flat rate area.

FM

Force management

FMC

Force management center

FMCRT

Force management cathode-ray tube

FM15

The force management quarter-hourly output report.

FM30

The force management half-hourly output report.

Force administration data system (FADS)

Software and hardware configurations that perform the force data collection, storage, manipulation, and display functions for a multitraffic office TOPS MPX.

Force administration data system TTY (FADS TTY)

The TTY that is used in multitraffic office TOPS MPX, and is located in the FMC. It provides a printed record of force management statistics for each of the traffic offices and for the TOPS MPX as a whole. It also serves as an

input and output terminal for various other input commands and output reports.

Force management (FM)

A reference to all of the functions and responsibilities associated with the management and administration of an operator work force.

Force management cathode-ray tube (FMCRT)

A specially configured TOPS terminal used to display TOPS MPX force management statistical data for each traffic office.

Force management center (FMC)

The physical location of force management administrative personnel. The management personnel in the FMC are the system manager, the force supervisor, and the facilities manager.

Force supervisor

The manager responsible for overall force management in a TOPS MPX with more than one traffic office. The force supervisor is located in the force management center.

FT Gateway

Fault Tolerant Gateway

GEN

General

General call queue (GEN)

In the TOPS ACD environment, call queue assignment for all calls that do not require transfer to a specialized operator.

Hundred call seconds (CCS)

A unit of time equal to 100 seconds. Reporting unit for calls waiting and work volume in the TOPS ACD environment.

IC manager

In-charge manager

IC position

In-charge position

Idle time (IDLT)

The time an operator spends at the position waiting for a call to arrive.

IDLT

Idle time

In-charge manager (IC manager)

The manager responsible for force management in one traffic office. In a single-traffic office TOPS MPX, the in-charge manager also performs the duties that a force supervisor performs in a multitraffic office TOPS MPX.

In-charge position (IC position)

A position used by the in-charge manager. Although it has the same hardware as an operator position, the in-charge position has a more extensive set of displays that allow the in-charge manager to monitor the overall status of the traffic office. In an ACD environment these displays are updated every ten seconds to reflect the present status of the traffic office. In a QMS environment they are updated in real time.

Initial position seizures (IPS)

A count of customer-oriented calls that reach operator positions. This count excludes position reseizures (for example, notify and coin overtime) and operator-originated calls (for example, subsequent attempts).

INTC

Intercept call

Interactive Voice Subsystem (IVS)

A system that announces a telephone number in response to an inquiry to an operator. The response is usually assembled by a computer from a prerecorded vocabulary of words.

Intercept call (INTC)

A call that is stopped and diverted to an operator or to a number other than the one dialed.

IPS

Initial position seizure

IVS

Interactive Voice Subsystem

Keyboard send/receive (KSR)

An input/output printer that is equipped with a keyboard for transmitting as well as receiving information.

KSR

Keyboard send/receive

Made-busy (MB)

An occupied operator position that is not in the idle position queue for either of the following reasons:

- The headset has been seated, but the **START** key has not yet been pressed (that is, prior to completion of the logon procedure).

- The **MAKE BUSY** key has been pressed after completion of the logon procedure.

Maintenance and administration position (MAP)

A group of components that provide a man-machine interface between operating company personnel and the DMS-100 Family systems. A MAP consists of a visual display unit and keyboard, a voice communications module, and test facilities.

Maintenance-busy

An operator position that has been removed from service either automatically by the DMS, or by a command entered from the MAP and TAMI.

MAP

Maintenance and administration position

MB

Made busy

Mechanized force administration data system (MFADS)

A minicomputer system that extracts FM measurements from a pollable port in TOPS MPX, and calculates summaries of service and force statistics.

MFADS

Mechanized force administration data system

Multitraffic office

An operator work force divided into geographically separate groups.

NCWV

Noncall work volume

Network operator trouble information system (NOTIS)

Facilities, provided at a TOPS position, that enable an operator to report trouble conditions by keying a previously defined 1-digit or 2-digit code. This code is then translated into an output message through an operating company client-controlled table, and the trouble condition is logged.

Noncall work volume (NCWV)

Work volume generated when an occupied position is not already handling a call, but is otherwise unavailable to handle a new call. For operators who

can handle only nontransfer (GEN) calls, NCWV is pegged against nontransfer totals, and the system total, but is not included in the general totals. System (SYST) total WV includes CBWV plus NCWV.

Nonqueue work volume (NQWV)

Type of work volume measurement when an operator does not perform a logon during the current FM measurement period and NCWV cannot be applied to queues.

Nontransfer operators

Operators not capable of receiving transferred calls from other TOPS MPX operators. These operators may, however, initiate a transfer.

Northern Telecom AMA format (NTFMT)

The format of the output AMA recording data, as specified by Northern Telecom.

NQWV

Nonqueue work volume.

NTFMT

Northern Telecom AMA format

Occupied position (POS OCC)

An operator position is considered occupied if a headset is plugged into the headset jack and the position is in an operating mode.

Occupied position CCS

Time (in CCS units) when operator positions are occupied and in the operating mode.

OC

Occupied position

OD

Out of order

Occupied position (OC)

An operator position that has a headset seated. The oc indicator on the FMCRT and in-charge position screens shows the number of occupied positions for the whole system (all traffic offices).

OGT

Outgoing trunk

OM

Operational measurements

Operating company

The owner/operator of a DMS switch.

Operational measurements (OM)

The hardware and software resources of the DMS-100 Family systems that control the collection and display of measurements taken of an operating system. OM organizes the measurement data and manages its transfer to displays and records on which maintenance, traffic, accounting and provisioning decisions are based.

Operator

Person who operates a TOPS MPX position.

Operator centralization (OC)

An extension of the operator services provided by TOPS. OC enables the operating company to handle traffic in several remote toll centers as though they were operating centers.

Operator number identification

The equipment used to bring an operator into the circuit to check the calling number when a subscriber has direct-dialed a long distance call that is to be charged on an itemized bill basis by CAMA equipment.

Operator position

An interactive terminal used to handle calls requiring operator assistance. Consists of a microprocessor-based controller, a keyboard, and a cathode-ray tube (crt).

Operator profile

A list specifying the TOPS call queues and service names that apply to a particular operator ID, and the team to which the operator belongs. The operator profile can also be used to assign controlled traffic queues to an operator.

Out of order (OD)

A position that has been removed from service by the system or by maintenance personnel. The OD indicator on the FMCRT and in-charge position screens shows the number of positions that are out of service, either because a command has been entered from the MAP or because the DMS has automatically removed the position from service.

Outgoing trunk (OGT)

A trunk used to route outgoing traffic. In the operator services environment, these may be used to route calls to the assistance and in-charge positions, to programmed numbers, and to transfer queues. They may also be used to mark calls for transfer or recall and to route calls to a senior operator. There

are six kinds of outgoing trunks in TOPS: language, dual-language (QMS only), transfer, outtrunk, assistance, and senior operator (QMS only).

Peg count

Single measured events.

Percent occupancy (%OCC)

Ratio of the portion of operator time spent handling calls to the total time operators are assigned TOPS MPX positions for the purpose of handling calls.

Percent transfer (%XFR)

The percentage of transfer calls in relation to nontransfer calls (appears only if the call transfer feature is active in the office).

%OCC

Percent occupancy

%XFR

Percent transfer

POS

Position

POS OCC

Occupied position

Position (POS)

The part of a TOPS MPX normally controlled by an operator.

Position seizure (PS)

Extended MFADS measurement of the number of calls per type of operator service in an FM reporting period. Position seizure values are based on IPS + TPS + RPS.

PS

Position seizure

QCD

Queue Management System calls deflected

QCQ

Queue Management System call queue

QCW

Queue Management System calls waiting

QFADS TTY

Queue Management System force administration data system teletypewriter

QMFADS TTY

Queue Management System mechanized force administration data system teletypewriter

QMS

Queue Management System

QTADS TTY

Queue Management System traffic administration data system teletypewriter

Queue

A series of customer calls waiting for attachment to operator positions.

Queue length

The number of subscribers waiting at a given instant to be attached to an operator position.

Queue Management System (QMS)

A software package that provides enhanced capabilities for the management of call and agent queues. QMS is a generic ACD system that can handle multiple ACD applications, of which TOPS is the first.

Queue Management System calls deflected (QCD)

An alarm condition that occurs when the calls deflect threshold has been met for one or more QMS call queues or when the defined call queue elements have been exceeded. The QCD display appears on the FMCRT and in-charge position screens and is updated on a 10-second basis. A TTY command is used to query which queue is affected.

Queue Management System call queue (QCQ)

An alarm condition that occurs when there are no operators logged on to handle a call in one or more QMS call queues. The QCQ display appears on the FMCRT and in-charge position screens when calls are assigned to a queue that is not named in any logged-in operator's profile.

Queue Management System calls waiting (QCW)

An alarm condition that occurs when the calls deflect threshold has been met for one or more QMS call queues. The QCW display appears on the FMCRT and in-charge position screens and is updated on a 10-second basis. A TTY command is used to query which queue is affected.

Queue Management System force administration data system teletypewriter (QFADS TTY)

> A TTY located in the force management center of a TOPS office with QMS. It provides a printed record of FM statistics for each traffic office and for TOPS QMS as a whole. It also serves as an input and output terminal for various other input commands and output reports.

Queue Management System mechanized force administration data system teletypewriter (QMFADS TTY)

> A minicomputer system that extracts QMS FM measurements from a pollable port in TOPS, and calculates summaries of service and force statistics.

Queue Management System traffic administration data system teletypewriter (QTADS TTY)

> A TTY located in each traffic office of a TOPS office with QMS. It provides a printed record of force management statistics for the traffic office in which it is located, and serves as an input and output terminal for various other input commands and output reports.

QFADS TTY

> Queue management system force administration data system teletypewriter

QMFADS TTY

> Queue management system mechanized force administration data system teletypewriter

QTADS TTY

> Queue management system traffic administration data system teletypewriter

RCAMA

> Remote centralized automatic message accounting

Ready-to-serve time

> The time during which an operator is waiting to answer incoming calls. This time is provided in the capacity table and is necessary if the operator team is to provide objective speed of answer.

Recall

> To bring an operator into an already established circuit.

Recall position seizure (RPS)

> Position seizure measurement that tracks the number of operator recalls in an FM reporting period.

Register

A storage device having a specified storage capacity such as a bit, a byte, or a computer word, and usually intended for a special purpose.

RPS

Recall position seizure

SA

Service assistant

SADS

System administration data system

SADS TTY

System administration data system TTY

SA position

Service assistance position

SAWT

Service average work time

Scan

To periodically sample the voltages that exist at like points in a number of similar circuits. By reading the current, the scanning device can determine whether the scan point is busy, and record the total busy counts in a register. If the group is scanned once every ten seconds, the register indicates XCS (ten call seconds).

Senior operator

An operator in a TOPS QMS environment who is assigned to provide assistance to other operators as well as handle incoming traffic.

Service assistance position (SA position)

A position used by service assistants. Although it has the same hardware as an operator position, the assistance position has a limited set of displays that reflect the general status of the traffic office to which it belongs. In addition, it can be used to answer assistance requests from operators and to initiate outgoing calls. These positions are restricted from call completion.

Service assistant

The person who uses the assistance position.

Service average work time (SAWT)

The time in seconds required to handle the average call within a specified service. The calculation for QMS TOPS is: CBWV/(IPS+TPS+RPS) for the specified service.

Service initiation (SI)

In TOPS ACD, measurement of the number of service calls (TA, DA, or INTC); used to calculate AWT. In TOPS QMS, measurement of the number of times a service is associated with a call, for both initial and subsequent assignments (such as switching from one service to another or applying the same service to a call to generate an AMA record); used to calculate SAWT.

Service work volume (SWV)

Work volume accumulated for services, pegged by service type and the operator's team.

SI

Service initiations

Single-traffic office

An entire operator work force contained in one location.

Sonalert

A special tone generated by the administrative positions (not in the headset) that alerts supervisors of special situations that require immediate attention.

ST

Study registers

Standard board half hours

The number of operators required in a half hour to handle the standard work volume CCS as read from the standard capacity table.

Standard board hours

The total of two standard board half hours, divided by two. In other words, the average number of occupied positions during the hour.

Standard work time (SWT)

The work time per call based on the local mix of calls equated with multipliers per type of call or call activity. These multipliers, developed during work time studies in a cross section of TOPS MPX include average allowances for inexperienced operators and operator unavailable time.

Standard work volume CCS

The product of half-hourly IPS or PS multiplied by the SWT per call and divided by 100 to convert to CCS.

Study registers (ST)

Software registers used to accumulate data associated with an operator ID, when that operator is logged on to a TOPS operator workstation.

Subscriber

The individual user of a telephone station set that is connected to a DMS-100 Family switch.

SWT

Standard work time

SWV

Service work volume

System administration data system (SADS)

Refers to the system that records data derived from TOPS MPX operational measurements used for management of a single-office operation.

System administration data system teletypewriter (SADS TTY)

The TTY that is used in single-traffic office TOPS MPX and is located in the traffic office. It provides a printed record of force management data, and also serves as an input and output terminal for various other input commands and output messages.

TA

Toll and assist

T&C

Time and charges

Table editor

In DMS, software that supports an enhanced set of table control functions at the man-machine interface, using data dictionary, formatter, and table control. A user is enabled to modify or add tuples to a table.

TADS TTY

Traffic administration data system teletypewriter

TAMI

TPC administration and maintenance interface

Teletypewriter

An electric typewriting device that generates a coded signal corresponding to each typed character. TTY also receives and converts coded signals into typewritten copy.

Ten call seconds (XCS)

A unit of time equal to ten seconds

Time and charges (T&C)

A service provided provided by operators whereby the duration of and charges for a long distance call are quoted to a subscriber upon request.

TO

Traffic office

TO15

The force management quarter-hourly output report, which is provided separately to each traffic office in a multitraffic office TOPS MPX.

TO30

The force management half-hourly output report, which is provided separately to each traffic office in a multitraffic office TOPS MPX.

Toll and assistance

Base service defined in the TOPS environment to include operator call handling of local and toll calls as well as non-call completion functions performed for the customer.

TOPS MPX

Traffic Operator Position System MPX.

TOPS position controller (TPC)

A control unit that functions as a workstation-based microcomputer with networking capabilities.

TPC

TOPS position controller

TPS

Transfer position seizure

Traffic administration data system teletypewriter (TADS TTY)

The TTY used in multitraffic office TOPS MPX. One TADS TTY is located in each traffic office. It provides a printed record of force management data that is separate for the traffic office in which it is located. It serves as an input/output terminal for various other input commands and output messages.

Traffic office (TO)

A grouping of operator positions for which the DMS provides separate administrative data.

Traffic office teletypewriter TTY (TADS TTY)

The TTY that is used in multitraffic office TOPS MPX. One TADS TTY is located in each traffic office. It provides a printed record of separate force

management statistics for the traffic office in which it is located, and serves as an output terminal for various other output reports.

Traffic Operator Position System MPX (TOPS MPX)

A directory assistance operator's position consisting of a controller, a video display, and a keyboard for performing directory assistance, monitoring call details, and entering billing information.

Transfer queues

Queues containing calls transferred from the general queue. Transfer queues may be designated as transfer 1 (XFR1), transfer 2 (XFR2), or transfer 3 (XFR3).

Transfer operators

Operators capable of receiving transferred calls from other TOPS MPX operators. Transfer operators may be designated as transfer 1 (XFR1), transfer 2 (XFR2), or transfer 3 (XFR3).

Transfer position seizure (TPS)

A count of customer calls that are transferred by an operator.

Trunk test position (TTP)

A maintenance and administration position that is specially equipped to perform trunk-testing.

TTP

Trunk test position

TTY

Teletypewriter

Tuple

A row in a DMS table.

UCD

Unoccupied position with a call disconnected

UCP

Unoccupied position with a call in progress

UMP

Universal Gateway/Position Message Protocol

Universal Gateway/Position Message Protocol (UMP)

UMP is the protocol supported by both the positions and the FT Gateway in TOPS MPX NT DA.

Unoccupied position with a call disconnected (UCD)

A position state that occurs when a call is held at the position, the operator logs off, and one or both of the call participants goes on-hook. The indicator UCD displays on the FMCRT and in-charge position screens to show the number of unoccupied positions with a call that has terminated.

Unoccupied position with a call in progress (UCP)

A position state that occurs when a call is held at the position, the operator logs off, and one or both of the call participants goes on-hook. The indicator UCP displays on the FMCRT and in-charge position screens to show the number of unoccupied positions with a call in progress.

Usage counts

Sampled measurements (states), used to determine the degree of usage of switching hardware and software.

Work volume (WV)

Time that occupied operator positions are handling calls or are otherwise unavailable to handle a new call. In the TOPS ACD environment, measured in XCS and reported in CCS; in TOPS QMS, measured in tenths of seconds and reported in seconds.

Work volume hundred call seconds (WV)

Work volume, expressed in hundred call seconds.

WV

Work volume

WV-CCS

Work volume hundred call seconds

XCS

Ten call seconds

XFR

Transfer

XFR1

Transfer one

XFR2

Transfer two

XFR3

Transfer three

DMS-100 Family

TOPS MPX NT DA

Force Management Guide

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