

297-1001-119

DMS-100 Family

Automatic Message Accounting — Northern Telecom Format

Reference Guide

BCS36 and up Standard 18.04 April 1998



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Publication history

April 1998

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- up-issued for update to Bellcore AMA paragraph on page 7-2. Records are not allowed to span blocks and unlike the NT format, the unused space is not padded.
- Also, the second paragraph under Bellcore AMA on page 7-2 which begins “Unlike the NT format...” is deleted.

May 1997

BCS36 Standard 18.03

- up-issued for addition of clarification note to LONG_TIMED_RELEASE_DISC_TIME parameter on page 6-5

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BCS36 Standard 18.02

- up-issued for minor editorial changes

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BCS36 Preliminary 18.01

- added new patcher information
- added a note on determining elapsed time of a billable call on page 5–8

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- incorporate elements of *Automatic Message Accounting—Northern Telecom to Bellcore Format Conversion Guide*, 297-1001-340, which has been canceled for BCS35.

October 1991

BCS33 Standard 16.01

- add information about a new sanity timer and its effect on NT AMA records produced for any call taken down on page 5–11.

March 1991

BCS29 Standard 15.04

- correct discrepancy regarding the recording of elapsed time for unanswered calls in “Elapsed time” on page 5–8
- removed erroneous example in CALLDUMP command description

- removed statement in AMADUMP command description that described the AMADUMP command as a non-resident command in pre-BCS25 offices. This document applies to BCS29 and forward offices.
- reformatted NTP to conform to new Northern Telecom documentation standards

September 1990

BCS29 Standard 15.03

- corrected errors in Table 4-1 on page 4-5

September 1989

BCS29 Standard 15.02

- added a description of changes to recording of parallel files
- added information on space rotations
- added information on the CALLDUMP command
- added a description of the CALL COUNT field contained in the AMA114 log report)

August 1990

BCS28 Standard 14.02

- corrected errors in Table 4-1 on page 4-5

May 1989

BCS28 Standard 14.01

- added a caution message regarding the removal of power from the DMS core and AMA.
- added a note associating record type F0 with Mechanized Credit Card Service (MCCS)
- clarified the description on the AMA112 log report.
- added description of the RECORD_CODE field contained in the AMAB100 and AMAB101 log reports

August 1990

BCS27 Standard 13.02

- Corrected errors in Table 4-1 on page 4-5

December 1988

BCS27 Standard 13.01

- added information on modules and the INTL format for AMADUMP command
- added information on 800 Plus Southbound in the called number field
- added caution regarding AMA rotation and planned restarts to the description of file rotations and records, and to the description of restarts

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About this document

This Publication describes the Automatic Message Accounting (AMA) system as it applies to:

- Local AMA (LAMA) in a DMS-100 Local office
- Centralized AMA (CAMA) in a DMS-200 Toll office

This Publication describes the Northern Telecom AMA Format only. For information pertaining to the Bellcore AMA Format, refer to *Bellcore Format Automatic Message Accounting Reference Guide*, 297-1001-830. NT is used to define the format described in accordance with Northern Telecom/Bell Canada record structures.

Descriptions on the method of collecting data for billing and traffic sampling purposes are included for the following call types:

- Access Charge Recording (ACR)
- Auxiliary Operator Services System (AOSS)
- Auxiliary Operator Services System with Voice Response (AOSSVR)
- Direct Dialing Overseas (DDO) for LAMA and CAMA
- Direct Distance Dialing (DDD) for LAMA and CAMA
- INWATS
- Local Call Detail Recording (LCDR)
- Long Duration Calls
- Mechanized Calling Card Service (MCCS)
- Automated Calling Card Service (ACCS)
- Premature Billing
- Recording of Unanswered Calls
- Terminating calls to a line
- Traffic Operated Position System (TOPS) assisted DDO
- TOPS assisted MCCS
- TOPS assisted DDD
- Overseas Operator Center (OOC) assisted.

The objective of the AMA subsystem is to collect call data and automatically record it on a data storage device.

During a call, most call-processing agencies store call information in the Call Condense Block (CCB). At call disconnect, this data is sent to a buffer.

The AMA process periodically checks the EXT queue, and whenever data is found, the data is formatted into a specific layout, such as NT or Bellcore, and stored in a 2048-byte buffer. When this buffer is full it is recorded onto an AMA recording device.

The method used by the AMA subsystem to record call data is the Device Independent Recording Package (DIRP) that automatically assigns the AMA records to selected recording devices such as disk or tape. See *DIRP Administration Guide*, 297-1001-345, for more information on DIRP.

Periodically this stored data is transferred manually or automatically to the Operating Company downstream data processing center for retrieval of the information necessary for correct customer billing and/or call analysis.

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 applies to DMS-100 Family offices that have BCS36. Unless the document is revised, it also applies to offices that have software releases greater than BCS36.

More than one version of this document may exist. To determine which version 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 (DI90)* 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

¹ TOPS is a trademark of Northern Telecom.

>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.

Where to find information

Documents that you require to understand the content of this document, or to do the tasks it describes, are referred to in the appropriate places in the text.

These documents, and others that contain related information, are listed in this section.

Note: More than one version of these documents may exist. To determine which version of a document applies to the BCS in your office, check the release information in *DMS-100 Family Guide to Northern Telecom Publications*, 297-1001-001.

Document	Title
297-1001-001	DMS-100 Family Guide to Northern Telecom Publications
297-1001-100	System Description
297-1001-118	Magnetic Tape Reference Manual
297-1001-340	Automatic Message Accounting—Northern Telecom to Bellcore Format Conversion Guide (cancelled for BCS35)
297-1001-345	Device Independent Recording Package (DIRP) Administration Guide
297-1001-451	Customer Data Schema
297-1001-455	Office Parameters Reference Manual
—continued—	

Document	Title
297-1001-500	Index to Maintenance Procedures Documents
297-1001-524	Remote Data Polling System Description and User Interface
297-1001-525	Data Packet Controller Reference Manual
297-1001-526	Disk Maintenance Subsystem Reference Manual
297-1001-572	Device Independent Recording Package (DIRP) Routine Maintenance Procedures
297-1001-590	Input/Output Devices Maintenance Guide
297-1001-814	Operational Measurements Reference Manual
297-1001-820	Nonmenu Commands Reference Manual
297-1001-821	Menu Commands Reference Manual
297-1001-830	Bellcore Format Automatic Message Accounting Reference Guide
297-1001-840	Log Report Reference Manual
297-2101-808	Service Order and Query System Reference Manual
297-2271-451	TOPS Customer Data Schema
411-2131-119	DMS-MTX Call Detail Record Reference Manual
TAM-1001-017	AMA Tools User Guide
End	

NT and BNR trademarks and the products they represent

The following chart lists all NT and BNR trademarks that occur in this document, and associates them with the products they represent.

Trademark	Product
DMS	<i>Digital multiplex system</i> telephone switching equipment
DMS SuperNode	telecommunications switching equipment
MAP	<i>Maintenance and administration position</i> telephone communication equipment

What precautionary messages indicate

In this document, caution, danger and warning messages indicate potential risks, as identified in the following chart.

Message	Significance
CAUTION	Possibility of service interruption or degradation
DANGER	Possibility of personal injury
WARNING	Possibility of equipment damage

Examples of the precautionary messages follow.



CAUTION

Calls are dropped when line group controller is busied.

Manually removing the line group controller from service removes all its subtending peripheral modules from service. All calls in progress are dropped.



DANGER

Risk of electrocution

The inverter contains high voltage lines. Do not open the front panel of the inverter unless fuses F1, F2, and F3 have been removed first. Until these fuses are removed, the high voltage lines inside the inverter are active, and you risk being electrocuted.



WARNING

Backplane connector pins may become damaged.

Use light thumb pressure to align the card with the connectors. Next use the levers to seat the card into the connectors. Failure to align the card first may result in bending of backplane connector pins.

How commands, parameters, and responses are represented

In this document, commands, parameters, and responses are represented according to the following conventions.

Input prompt (>)

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

Type the command that follows the input prompt and press the carriage return key.

Capital letters

Capital letters represent commands, fixed parameters, and responses that appear at a MAP.

Enter the command or fixed parameter exactly as it appears on the page.

Lowercase letters

Lowercase letters represent variables.

For commands and parameters, enter the letters or numbers that the variable represents. In most instances, the name that is used for the variable indicates clearly what you must enter. Where it does not, further explanations are provided.

In responses (which are presented in capital letters), lowercase letters represent a range of values.

The following example illustrates the command syntax that is used in this document.

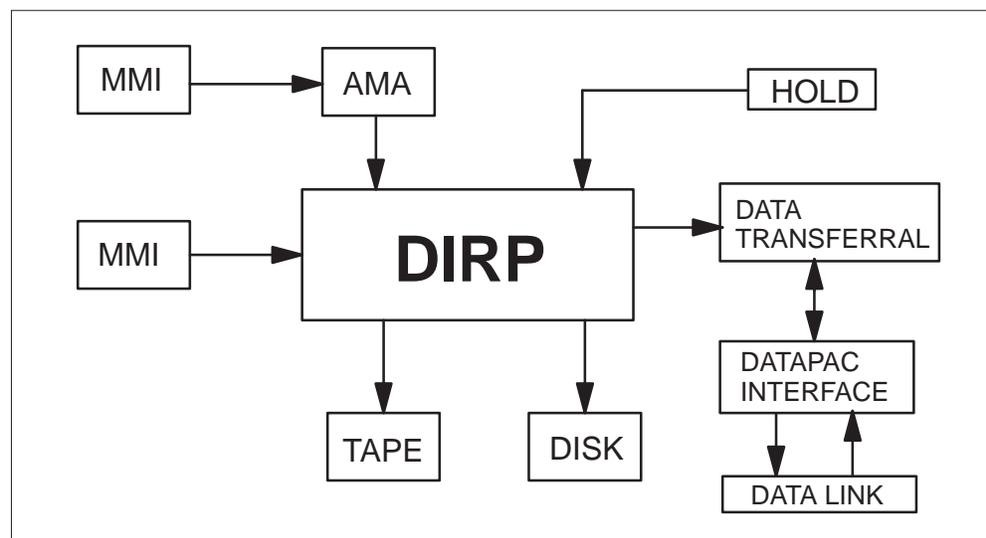
Examples of command syntax used in this document	
Step	Action
1	Post the card in the inactive unit.
<i>input></i>	>POST unit_no card_no state
<i>parameters></i>	where unit_no is the number of the inactive unit (0 or 1) card_no is the number of the card you replaced (22-27) state is the state of the unit in which you wish to replace the card (Insv, SysB, ManB or Offl)
<i>Example input></i>	For example: >POST 7 1 INSV
<i>Example output></i>	CARD 7 IS POSTED IN UNIT 1 OF MSB16

Recording facilities

General

The facilities currently available for the recording of AMA data are disk and magnetic tape, and are defined by the Operating Company using the DIRP subsystem. See Figure 1-1.

Figure 1-1
AMA Recording Facilities



DIRP

DIRP uses Tables DIRPPOOL and DIRPSSYS to determine the device type available for recording AMA data and causes the data to be written to the file. Other functions of DIRP, described in *Device Independent Recording Package (DIRP) Administration Guide*, 297-1001-345, include:

- device control
- file information
- storage device alarms
- logs

Disk

With disk a maximum of four files may be open simultaneously for input or output. Disks are logically divided into volumes, each of which can be a different size. The maximum number of volumes per disk is 32; the minimum is 1. The volume is defined in terms of the number of 1k (1024 bytes) sectors. The maximum volume size is 64k (65535) 1k sectors, giving up to 64 Mbytes of data space. It is estimated that the system uses less than 7% of the recording media for overhead, varying with the number of volumes and number of files per volume. Most of this is incurred in the formatting of the unit.

The volume allocation is done once at configuration time, using Operating Company information as to what subsystem will be using the recording facility and the anticipated volumes of the subsystems. As the disk volumes are assigned to DIRP, they are pre-formatted into numerous small files.

Four additional volumes may be equipped and may be opened by DIRP in the event that one of the open files becomes full or cannot be used due to failure.

Tape

With magnetic tape as the data storage medium, the system may have from one to four files (tape drives) held in the open mode, each representing a single volume.

Four additional volumes may be equipped and may be opened by DIRP in the event that one of the open files becomes full or cannot be used due to failure.

Parallel files

For disk or tape a parallel file may be assigned so that each block of data written onto an active file is also written onto the parallel file. This parallel file serves as a backup only. When it becomes full it is reset and overwritten with new data. During the reset it is possible that some data blocks will not be written onto the parallel tape file.

Feature package NTX220 allows both active and parallel recordings to occur concurrently instead of sequentially. This minimizes synchronization problems caused by the physical file system which can cause one type of recording to slow down the other. Field PARCONC in Table DIRPSSYS controls this recording option. See 297-1001-345 for more information.

Tape labels

The DMS-100 Family of Switching Systems uses and supports only IBM Standard Tape Labels. This provides Operating Companies with efficient control of tapes at both the data center and the DMS locations through the identifier and date information contained within the labels. See *Magnetic*

Tape Reference Manual, 297-1001-118 for label format. Tape label checking occurs when a tape is mounted as an AMA reserve.

Tape security

The methods used to maintain a high level of security for AMA files are as follows:

- 1 **Expiration Date Check:** An EXPIRATION DATE field is provided in the Header1 (HDR1) data block to prevent accidental overwriting of the tape file. The file is regarded as expired when today's date is equal to or later than the date given in this field. When this condition is satisfied, the remainder of this volume may be overwritten. The value of this field is the creation date plus an optional value.
- 2 **Data Set Name (DSN) Check:** All DMS tapes are initialized with a code of up to 17 Extended Binary-Coded Decimal Interchange Code (EBCDIC) characters in the Data Set Identifier (DSI) of the HDR1 label. When a DMS office is first commissioned, the telephone company supplies a code of up to 17 EBCDIC characters to be used as the Data Set Name (DSN) of AMA data files. If less than 17 characters are used, the DSN, as it appears on the tape, is left justified and padded with spaces.

The DMS system reads the IBM standard labels which have previously been recorded on the tape and displays the source of their content (DSN, creation date, and expiration date) on the MAP or TTY. The DMS system then asks for confirmation of the MOUNT command. To confirm, the maintenance personnel must type in the DSN which was displayed on the terminal. If anything else is typed in the MOUNT, the request is aborted.

- 3 **Standby Tape Check:** A request to DEMOUNT the active AMA tape will fail. An active AMA tape can be removed from its drive only after the active AMA tape is made standby by the AMA system or by Operating Company personnel.

File rotations and records

A rotation to another file takes place for the reasons outlined as follows:

- **Manual:** Maintenance personnel may, by the use of DIRP command ROTATE, manually rotate files.
- **Scheduled:** By means of the DIRP Table DIRPSSYS, files may be rotated on a scheduled basis.
- **Space Rotate:** By means of the DIRP Table DIRPSSYS, files may be rotated when DIRP senses that it is running low on free space or reaches a specified size limit. Unexpired processed files can also be prevented from being erased by DIRP before they have passed their retention period.

- **Emergency:** Events such as failure of an active tape or disk drive, a full file, or a broken tape will cause an emergency rotation.
- **DTR:** Data Transfer Requested (DTR) is controlled by field AUTOXFER of Table DIRPSSYS. DTR is sent when polling of the AMA data is attempted by the downstream data processing center.

CAUTION



It is recommended that all AMA volumes be rotated previous to any planned restart or manual Switch Activity (SWACT). It is also recommended that following any form of restart, AMA status is checked to ensure that it is active and that AMA billing data is being collected.

Record entries are made with each file rotation (transfer). For detailed information, refer to Page 3-5.

Power removal

Refer to the following when removing power.

CAUTION



Extreme caution should be used in removing power from the core modules as interruptions of AMA billing data could result. If the IOC needs to be powered down, the AMA billing device (tape, disk, DPP) will have to be configured onto the IOC's that will remain in-service. AMA data currently on disk should be processed prior to removing the IOC from service if time permits. Once the IOC is removed from service and powered down, the CMC should be removed from service and then the CPU can be removed from service. Should any system initializations occur, some previously manually busied equipment may be put back into service. Such equipment should be made manual busy again as system diagnostics will be invoked and will use system real time unnecessarily. Refer to *Index to Maintenance Procedures Documents*, 297-1001-500 for more switch maintenance information.

Data collection

AMA recording methods

The data blocks of an NT AMA file are recorded in fixed format. See *Magnetic Tape Reference Manual*, 297-1001-118 for more information on magnetic tape.

Encoding technique

The encoding technique used in assembling the call data is Binary Coded Decimal (BCD).

The DMS AMA system uses a single entry format. The system captures all relevant call details, and at call completion the call information is mapped into the output format and stored in the AMA buffer.

In offices with feature NTX081, immediately following call completion a check is performed to determine if the AMA call data is to be converted (translated) from BCD to EBCDIC before being placed in the AMA buffer.

The maximum block size supported by the DMS file system is 2048 bytes. A record is not allowed to span blocks; therefore, if a record does not fit within the current block, that block is written onto the active file and the record is inserted in the next block. If necessary, with fixed format, padding with filler character (X“A”) is used to conform to the recording format supported by the DMS file system.

Data file

The data file structure of the NT AMA format, as shown in Table 2-1, consists of blocks containing up to 2048 bytes of information with the first record entry being a block header followed by the necessary AMA records, as described in this document.

Table 2-1 Sample NT AMA data file structure	
Record type	Record content
Block header record	Record code Date/time Block count Office ID
Call record	Record code Entry code Information digits Service feature digits Calling number Called number Event information digit Answer date/time Conversation time TOPS additive
Extension call record	Special billing Hotel Charge Charge adjust
Clock change record	Record code OLD: date/time NEW: date/time
Restart record	Record code Type of restart Date/time
File rotation record	Record code Rotation date/time

AMA failure routing

During the process of recording and storing billing information and prior to the actual writing of this information onto an AMA device, the following interruptions could occur, resulting in charge-free calls:

- no recording unit extension block available
- no AMA devices or files available
- the AMA process traps due to software bugs, necessitating a warm restart to recover the AMA system.

Options

In offices equipped with feature NTX030CC and related features, calls encountering such AMA failures can, at the discretion of the Operating Company, be routed as follows:

- **Free-of-charge:** parameter AMA_FAILURE_FREE_CALL of Table OFCENG is set to Y (yes).

- **To TOPS/TSPS or to an announcement or tone:** parameter AMA_FAILURE_FREE_CALL of Table OFCENG is set to N (no), causing all toll calls to be routed according to parameter AMA_FAILURE_ROUTE_POSITION of Table OFCVAR, that specifies the position in Table POSITION to which the calls are to be routed. The default for AMA_FAILURE_ROUTE_POSITION is AMAFAIL. The Operating Company must datafill AMAFAIL in Table POSITION with an office route reference index that refers to a route list in Table OFRT. If this is not done the routed calls will be taken down with CCB and CDB dumps.

AMARESTART command

When an AMA software failure occurs, Operating Company personnel can use the AMARESTART command to recreate the AMA process.

AMARESTART	stream
------------	--------

causes the recreation of the desired AMAPROC child process.

Note: The system will attempt to automatically recreate the AMA stream AMAPROC process once every 10 minutes.

Parameters:

stream specifies the stream associated with the AMAPROC process. There is one AMAPROC process for each stream defined in Table CRSFMT (*Customer Data Schema, 297-1001-451*).

System responses:

AMA DADDY PROCESS (AMAEI) DID NOT RESPOND FOR STREAM: XXX; THIS IS A POTENTIAL EMERGENCY CONDITION. ENTER >QUERY PROCESS AMAEI> AND INVESTIGATE.

Explanation: A severe software error has occurred.

User action: Contact the next level of maintenance immediately.

AMAPROC PROCESS COULD NOT BE RESTARTED FOR STREAM: XXX

Explanation: The AMAPROC process was dead, could not be restarted, and is still dead.

User action: Contact the next level of maintenance.

AMAPROC PROCESS HAS BEEN RESTARTED FOR STREAM: XXX

Explanation: The AMAPROC process was dead but now has been restarted.

User action: No user action is required.

AMAPROC PROCESS IS ALREADY RUNNING FOR STREAM: XXX

Explanation: Stream 'xxx' is healthy. No action is taken.

User action: No user action is required.

COMMAND IGNORED. NO ACTIVE STREAMS EXIST.

Explanation: Table CRSFMT has no active streams defined.

User action: A data stream must be datafilled into Table CRSFMT. Streams are activated by a restart.

COMMAND REJECTED. SPECIFIED STREAM IS INVALID.

Explanation: The stream specified as the command parameter does not appear in Table CRSFMT.

User action: Retype command using valid stream or datafill stream into Table CRSFMT. A stream is activated by a restart.

COMMAND TERMINATED DUE TO REQUEST.

Explanation: The user has entered NO in response to a prompt as to whether to proceed.

User action: No action is required.

THIS COMMAND WILL CAUSE A DEAD AMAPROC PROCESS FOR THE SPECIFIED STREAM TO BE RESTARTED.

DO YOU WISH TO PROCEED?

Explanation: This is in response to the user entering the AMARESTART <stream> command.

User action: Enter yes to proceed, no to terminate command.

THIS COMMAND WILL CAUSE DEAD AMAPROC PROCESSES FOR ALL STREAMS TO BE RESTARTED.

DO YOU WISH TO PROCEED?

Explanation: This indicates that AMARESTART was entered without a specified stream.

User action: Enter yes to proceed, no to terminate command.

**UNEXPECTED RESPONSE FROM AMA DADDY (AMAEI) FOR STREAM: XXX;
THIS IS A POTENTIAL EMERGENCY CONDITION. ENTER >QUERY PROCESS
AMAEI> AND INVESTIGATE.**

Explanation: A severe software error has occurred.

User action: Contact the next level of maintenance immediately.

**UNKNOWN AMAPROC PROCESS STATE FOR STREAM: XXX; ENTER
<QUERY PROCESS AMAPROC> AND INVESTIGATE**

Explanation: A severe software error has occurred.

User action: Contact the next level of maintenance immediately.

Example:

CI:

>AMARESTART ama

**THIS COMMAND WILL CAUSE A DEAD AMAPROC PROCESS FOR THE
SPECIFIED STREAM TO BE RESTARTED.**

DO YOU WISH TO PROCEED?

>YES

AMAPROC PROCESS HAS BEEN RESTARTED FOR STREAM: XXX

CI:

NT AMA general record types

Please note: Information on the CALLDUMP/AMADUMP utilities can now be found in *AMA Tools User Guide*, TAM-1001-017.

Following is a description of the records entered onto an AMA file for other than call-related data. The record structure, in block format, precedes each description. The number of characters required for each field is shown within parentheses. Refer to Figure 3-10 for example block layouts.

Block header record—C1C1

The Block Header Record is the first record of every block written onto an AMA file. A typical block header record is shown in Figure 3-1.

Figure 3-1
Block header record—C1C1

Record Code "C1C1"	Day	Hour	Block Count	Office ID
(4)	(3)	(2)	(5)	(6)

The following is a description of the record contents:

- **Record Code:** identifies the record as "C1C1".
- **Day:** identifies the day in the year. Value = 001-366.
- **Hour:** identifies the hour of entry. Value = 00-23.
- **Block Count:** is a sequential block count which is incremented by one each time a block is written on the AMA file. See note. Value = 00000-65535.
- **Office ID:** is the standard office identification number assigned by the Operating Company to all new central offices.

Note: 1 The block count automatically resets to zero on the next increment after the maximum count of 65,535 is reached but will not be reset when file rotations or warm or cold restarts occur.

Note: 2 In the case of an activity switch of a CPU, from active to inactive state, the block count is affected as follows: 1) **CPUs both in sync.** The count continues sequentially from last increment. 2) **CPUs not in sync (cold start) and file rotation.** The block count on the “to” file could be any number. The data in the last block of the “from” file could be incomplete following an activity switch. There is no repeat on the “to” file due to cold start. The downstream process detects the fault.

Clock change entry record—FE

A clock change entry is recorded on the active AMA file in the event of a change to the system time. It is shown in Figure 3-2. Changes to system time can occur automatically or may be initiated manually by Operating Company personnel.

Figure 3-2
Clock change entry record—FE

Record code “FE” (2)	Old time				New time			
	Day (3)	Hour (2)	Min (2)	Sec (2)	Day (3)	Hour (2)	Min (2)	Sec (2)

The following is a description of the record contents:

- **Record Code:** defines the clock change record. Value = FE
- **Old Time:** defines the time of day prior to the clock change as follows:
 - Day: 001-366
 - Hour: 00-23
 - Minute: 00-59
 - Second: 00-59
- **New Time:** defines the new time of day at the clock change as follows:
 - Day: 001-366
 - Hour: 00-23
 - Minute: 00-59
 - Second: 00-59.

Restart record—FD

A restart entry is made if a warm or cold restart occurs, and identifies the type of restart and time of occurrence. A restart record is shown in Figure 3-3.

Figure 3-3
Restart record—FD

Record code "FD"	Restart Type	Restart time			
		Day	Hour	Min	Sec
(2)	(1)	(3)	(2)	(2)	(2)

The following is a description of the record contents:

- **Record Code:** defines the restart record. Value = FD
- **Restart Type:** defines the restart as follows:
 - 0 = Warm Start
 - 1 = Cold Start
 - 2 = Premature Billing Record Start
 - 3 = Premature Billing Record End
- **Restart Time:** defines the time of day of the restart as follows:
 - Day: 001-366
 - Hour: 00-23
 - Minute: 00-59
 - Second: 00-59.

Restart Levels

There are two levels of system initialization for which a restart entry is made.

- 1 **Cold Restart.** A cold restart occurs when system sanity is lost and all calls which are in progress at the time of the cold restart are terminated. Billing information associated with these calls is lost. If an activity switch precedes a cold restart, any billing information which is stored in the AMA buffer that has not been written out to an AMA file is also lost. AMA data written on the AMA file prior to a cold restart remains intact.

The premature billing of certain calls, prior to a switch of CPU activity (SWACT), is available in offices equipped with feature package NTX181. See “Premature billing” on Page 6-2.

- 2 **Warm Restart.** A warm restart is a level of system initialization which erases all data in temporary store but allows calls in the talking state to continue. The AMA data remains intact and the ACTIVE file remains ACTIVE. AMA entry adjustments are shown in “Warm restart entry adjustments” on Page 3-4.

CAUTION



It is recommended that all AMA volumes be rotated previous to any planned restart or manual swact. It is also recommended that following any form of restart, AMA status is checked to ensure that it is active and that AMA billing data is being collected.

Warm restart entry adjustments

If a call is disconnecting or answering during a warm restart, it is possible for an event such as Elapsed Time to be lost. The AMA billing record is therefore adjusted as follows:

- 1 **Restart across DISC message (calling or called).** The subsequent message clears call in Central Control.

Answer previously received—

Event Info = 0
Elapsed Time = 0
Start Time = Original answer or connect time

Operating Company option to bill for minimum period or up to restart time is derived from the restart entry appearing previous to billing record.

No answer previously received—

Event Info = 2
Elapsed Time = 0
Start Time = Original answer or connect time

2 Restart across ANSWER message.

Subsequent calling disconnect—

Event Info = 0
Elapsed Time = Conversation time
Start Time = Original connect time

Subsequent called disconnect—

Event Info = 1
Elapsed Time = 0
Start Time = Original connect time

File rotation records—FA FB FC

A rotation record is made whenever a tape rotation occurs and is shown in Figure 3-4.

Figure 3-4
File rotation records—FA FB FC

Table with 6 columns: Record code (2), Filler digit X'0' (1), and Rotation time (Day (3), Hour (2), Min (2), Sec (2)).

The following is a description of the record contents:

- Record Code: defines the rotation record as follows: FA = Incoming Non-Emergency, FB = Outgoing Non-Emergency, FC = Incoming Emergency.
Filler: represents a filler character X'0'
Rotation Time: defines the time of day of the file rotation as follows: Day: 001-366, Hour: 00-23, Minute: 00-59, Second: 00-59

A rotation to a standby tape unit takes place for the following reasons:

- maintenance personnel request rotation
- automatic transfer is scheduled
- tape on active drive is full end-of-tape (EOT) marker is exposed
- active drive fails
- tape is broken
- disk file with no erasable files is full
- end-of-disk file marker is reached.

Note: Either of the last two occurrences constitute a tape unit failure, and the last three occurrences generate an output report and an alarm. See 297-1001-840 for more information on log reports.

Rotation entries are entered into a buffer each time a rotation occurs and are classified as follows:

- **Non-Emergency Transfer:** an outgoing transfer entry is made into the buffer prior to the buffer being written onto the still-ACTIVE tape just before transfer.

An incoming transfer entry is the only entry of the next buffer load and is immediately written onto the newly-ACTIVE tape.

- **Emergency Transfers:** when an emergency transfer occurs and the full buffer cannot accept the transfer entry, it becomes the only entry in the second buffer and is immediately written to the newly active file as the second block.

In the event of a broken tape the complete Record Block in the buffer at the time of the break is rewritten on the new tape with a flag to indicate the media change (file rotation).

Note: With multiple transfer requests a tape could change status from STANDBY to ACTIVE and back several times, resulting in incoming and outgoing entries being made for each request. Therefore, when an outgoing transfer entry is encountered on an AMA tape in the downstream process it should not necessarily be interpreted as the end of the billing information until an End of File (EOF) is encountered.

Total call counts on an AMA file

This feature records AMA file call counts at the end of the file when a file rotation is executed. The call counts are appended to the present outgoing rotation entry "FB". See "File rotation records—FA FB FC" on Page 3-5 and Figure 3-5.

- **NLOI:** ONI line class calls.
- **NLIF2:** Overflow count for NLIF.
- **NLIF:** Line identification failures.

Note: 1 All counts are in binary and are effectively 32 bits (a 16 bit primary counter plus a 16 bit overflow counter).

Note: 2 The counts are based on file entries. Calls which do not generate file entries do not generate a count. For example, if unanswered calls are not being recorded, they are not included in the counts.

Note: 3 The entries on file are equal to the sum of the counts, while overflow counts are multiplied by 20^{16} as follows:

NANI2	NANI
NANIF2	NANIF
NANOF2	NANOF
NONI2	NONI
NLNI2	NLNI
NLIF2	NLIF
+ NLOI2	+ NLOI
XXX	YYY

$$\text{TOTAL} = [\text{XXX} * 20^{16}] + \text{YYY}$$

Counts are binary encoded.

DMS-100 offices have zero NANI, NANI2, NANIF, NANIF2, NONI, NONI2 counts. DMS-200 offices have zero NLNI, NLNI2, NLOI, NLOI2, NLIF, NLIF2 counts. All counts are applicable to DMS-100/200 offices.

Trunk Identifier On AMA File

NTX076 allows the Operating Company to record the incoming and outgoing trunk identifiers (CLLI) in addition to the normal billing information now provided by the AMA system. Refer to Table CRSFMT field DATADUMP.

The data group block header record, C2C2, is similar to the AMA call record block header C1C1 but it contains additional information regarding the format of the data and the logical record length. At the end of the data dump, a dump termination record is output. Any remaining space in the block is filled with X“aa”.

Note: 1 This feature is only applicable to DMS-200. (Incoming CAMA trunk to outgoing trunk).

Note: 2 The first logical record on the AMA file is no longer the incoming transfer “FA”. On mounting the tape as AMA, the data table is output and only after it is assigned does it become available for AMA call recording.

AMA Extension Entry Record—EE

The AMA extension entry record is produced by the trunk identifier on AMA file feature and is shown in Figure 3-6. The record is 9 bytes long and is BCD/binary encoded.

Figure 3-6
Extension entry record

Record Code “EE”	SP	IGRPID msb	lsn	OGRPID lsb	IMEMID msb lsb	OMEMID msb lsb
(2)	(1)	(1)	msn	(1)	(2)	(2)

The following is a description of the record contents:

- **Record Code:** denotes the entry code set. Value = X“EE.”
- **SP:** stands for spare. Value = zero.
- **IGRPID:** denotes the incoming group identifier and may be converted to CLLI character form as described in “Identifier translator tables” following. IGRPID shares half a byte with OGRPID. See Notes 1 and 2.
- **OGRPID:** denotes the outgoing group identifier and may be converted to CLLI character form as described in “Identifier translator tables” following . OGRPID shares half a byte with IGRPID. See Notes 1 and 2.
- **IMEMID:** denotes the incoming trunk number (member) in a group and may be directly converted from binary to 4 character representation. See Note 1.
- **OMEMID:** denotes the outgoing trunk number (member) in a group and may be directly converted from binary to 4 character representation. See Note 1.

Note: 1 On line to OC calls, in B0 type AMA records, if the EE record entry contains the value 2047 as the trunk group and a value of 31 as the trunk member, it indicates that the call is either terminating or originating on a non-trunk circuit.

Note: 2 The bytes are broken down as follows:

- lsb = least significant byte, (low order 8 bits)

- msb = most significant byte, (high order 8 bits)
- lsn = least significant nibble, (low order 4 bits)
- msn = most significant nibble, (high order 4 bits).

Identifier translator tables

In order to convert the numerical identifiers to external identifiers (such as the CLLI), a data record K is output when the tape is mounted as an AMA tape. The data is formatted using the Block Header Record C2C2.

On mounting an AMA file, data tables may be specified for outputting. If so, the unique block header is output which identifies the block as a data group block and provides information about the logical data records.

The data records K and E are EBCDIC encoded, variable length (9 to 130 characters), and unspanned.

Data group block header record—C2C2

Data group blocks are recorded as 2048 byte blocks. Preceded with this C2C2 header, X“40” EBCDIC space characters are used for padding the record to specified length.

Figure 3-7
Data group block header record—C2C2

Record Code “C2C2” (4)	Day (3)	Hour (2)	Block Count (5)	Office ID (6)	Format (1)	Length (3)
-------------------------------------	-------------------	--------------------	---------------------------	-------------------------	----------------------	----------------------

The following is a definition of the record contents:

- **Record Code:** identifies the record as “C2C2”
- **Day:** identifies the day in the year. Value = 001–366
- **Hour:** identifies the hour of entry. Value = 00–23
- **Block Count:** denotes a sequential count starting at 0 on each file and incrementing by one each time a file is written. Value = 00000–32767
- **Office ID:** denotes the number assigned by the Operating Company to all new central offices
- **Format:** denotes the format used. 0 = EBCDIC
- **Length:** denotes the logical length of the record. Value = 9–130.

Data Group translator record—K

The data group translator record indicates the conversion of numerical identifiers to external identifiers. This record is preceded by a C2C2 header record.

Figure 3-8
Data group translator record—K

SP	RSN	SP	Record type "K"	SP	Group ID	SP	CLLI GRP name
(1)	(5)	(5)	(1)	(1)	(4)		(16)

The following is a description of the record contents:

- **SP:** denotes one or more space characters, EBCDIC (X“40”).
- **RSN:** denotes the Record Sequence Number, which is a sequential counter cycling from 0–32767.
- **Record Type:** defines the type of record as a Data Group Record (“K”) which contains data accessed via the KEY field. The KEY field is not necessarily sequential.
- **Group ID:** identifies the Group ID being translated to CLLI characters. Value = 0000–2047.
- **CLLI GRP Name:** defines the CLLI of the group. It may be up to 16 characters, left justified, and padded with spaces as required.

Data group termination record—E

The end of a data table is denoted by a dump termination record shown in Figure 3-9. Unused space in a 2048 byte block following this record is filled with X“aa”.

Figure 3-9
Data group translator record—E

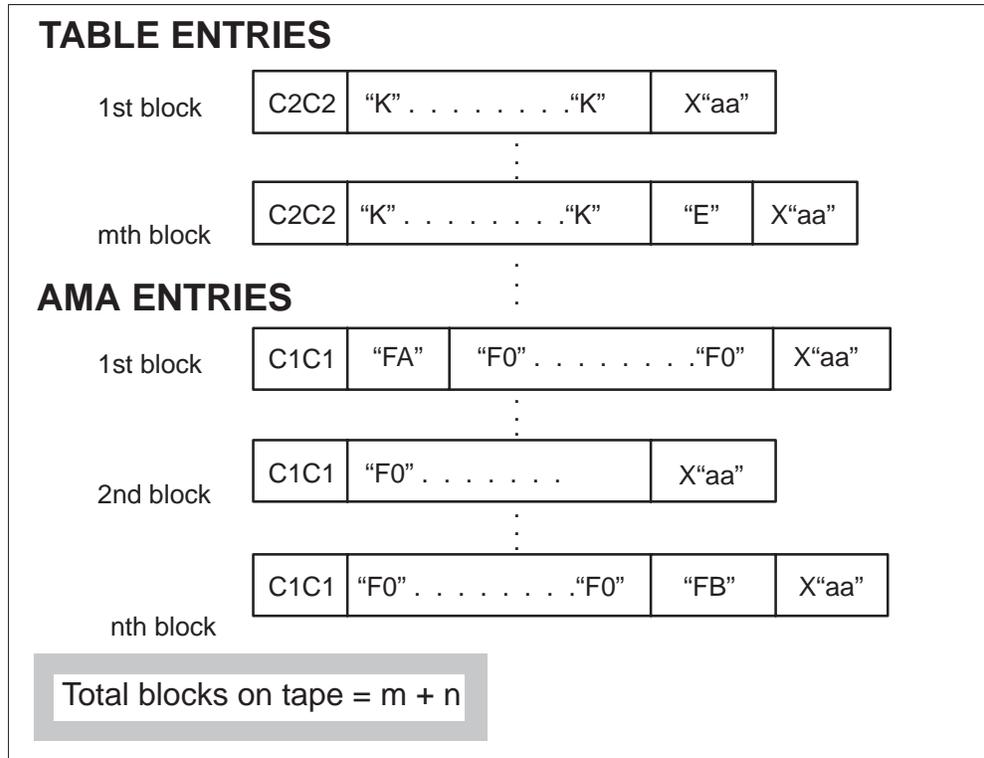
SP (1)	RSN (5)	SP (5)	Record type "E" (1)	SP (1)	SP (21)
------------------	-------------------	------------------	-------------------------------	------------------	-------------------

The following is a description of the record contents:

- **SP**: denotes one or more space characters.
- **RSN**: denotes the Record Sequence Number, which is a sequential counter cycling from 0–32767.
- **Record Type**: defines the type of the record as a Data Group Termination Record (“E”) indicating the end of a data group dump.

Note: The relatively short E record is padded with X“40” to conform to the length specified for the block in the associated C2C2 block header record.

Figure 3-10
Example—Data and Call Entry Block Layout



NT AMA call record types

The call records containing the necessary billing details are broken into the following categories:

- CAMA, LAMA, LCDR, and INWATS call records
- TOPS assisted call records
- AOSS handled call records
- AOSSVR handled call records
- OOC handled call records
- TOPS and OOC extension call records

CAMA, LAMA, CDR and INWATS call records

All customer dialed non-coin station to station DDD or DDO calls not requiring operator assistance and INWATS calls fall into this category and are divided into record types, each with a record code as follows. See Note 1.

- B0 Originating Access Charge Recording (ACR), note 2
- B1 Terminating ACR, note 2
- B4 800+ DDD calls
- B5 800+ DDO calls
- F0 CAMA DDD calls, note 6
- F2 CAMA DDO calls
- F4 LAMA DDD calls
LCDR calls, note 3
- F5 INWATS calls
Terminator Billing Option (TERMBOPT), note 4
- F6 LAMA DDO calls
- F7 Mobile Telephone Exchange (MTX) record, note 5.

Note: 1 For call entry record content by Record Code, refer to Table 4-1 and Table 4-2. For a description of record content by field name refer to Chapter 5.

Note: 2 Access Charge Recording (ACR) is the NT AMA system of billing Feature Group B (FGB) calls provided in end offices equipped with feature NTX268, or tandem offices equipped with feature NTX190

FGB is a plan providing Other Common Carriers (OCC) access for the origination and termination of calls to the Bell Operating Company (BOC) network.

A subscriber desiring access to the OCC network dials the code 950-10xx, where xx identifies the OCC to which the call is directed. Upon receipt of a second dial tone provided by the OCC, the subscriber enters an optional personal identification number (PIN) followed by the desired number. Billing record B0 is used for this originating call type while the B1 record is used for terminating calls.

Note: 3 LCDR, NTX043, and NTX207 are features of a LAMA-equipped switch that permits the recording of details relating to non-DDD type customer dialed calls. This data may be used by the Operating Company for call analysis or billing. See *Customer Data Schema*, 297-1001-451, and *Service Order and Query System Reference Manual*, 297-2101-808, for more information.

Note: 4 In offices equipped with feature package NTX080, the Operating Company may provide the billing of calls, other than INWATS, that terminate on a line. The Entry Code of the F5 record identifies terminator billing. The feature is a hunt group option and may be provided to those customers with one or more lines. Refer to Tables HUNTGRP and TOLLENTC and to *Service Order and Query System Reference Manual*, 297-2101-808, for more information.

Note: 5 Refer to 297-2131-119 for the format and content of this record.

Note: 6 This format (F0) could also contain billing and extension records for 1+ coin calls handled via the Automatic Coin Telephone Service (ACTS).

TOPS, AOSS, AOSSVR, and OOC assisted call records

All calls requiring the assistance of an operator, including ONI, ANI fail, and verification type calls fall into this category, with the record codes as follows. See Table 4-1, and Chapter 5:

- B3 OOC handled calls (see note 2)
- B6 800+ TOPS assisted domestic calls
- B7 800+ TOPS assisted overseas calls
- B8 AOSSVR handled calls (see note 1)
- F1 TOPS assisted DDD calls (see note 3)
- F3 TOPS assisted DDO calls
- F8 AOSS handled calls (see note 1).

Note: 1 Auxiliary Operator Services System (AOSS), feature NTX131, is a traffic system physically similar to TOPS that enables the Operating Company to handle and record such customer originated calls as are defined in Chapter 5. Refer also to Tables AOSS and AOSSAMA. Auxiliary Operator Services System with Voice Response (AOSSVR) allows requested information to be provided to a caller by an Operator Service Voice Response (OSVR) treatment.

Note: 2 Overseas Operator Center (OOC) is a traffic system physically similar to TOPS and provides gateway operator services.

Note: 3 This format (F1) could also contain billing and extension records for calls handled via Mechanized Credit Card Services (MCCS).

Extension call records (TOPS and OOC)

Each TOPS assisted call (record types F1, F3, B6, and B7) and OCC handled call (record type B3) can be supplemented as required by one or more extension records. Extension records record the following additional call details necessary for accounting purposes. See Table 4-3 and Chapter 5 for record field descriptions.

- Special Billing
- Hotel
- Charge
- Charge Adjust.

Sample call record entries

Call records are written to a file singly or in groups. A DDD station to station call is entered as a single record on a file while a DDO with credit card billing requires two records. The following are some sample call record entries:

<u>Call Type</u>	<u>Per Call Record(s)</u>
1+ DDD	(F0)
0+ DDD Station or person collect	(F1)
011+ DDO	(F2)
01+ DDO Credit Card	(F3)(E0)
0+ DDD Time and Charges	(F1)(E2)
1+ DDD Coin Station Paid	(F1)(E2)
1+ DDD Coin (ACTS)	(F0)
1+ DDD Hotel Station Paid	(F1)(E1)(E2)
0 DDD Free Standing Credit Request	(F1)(E4)
1+ DDD Coin, change of billing to 3rd, at NFY 3 with PTR credit request at beginning.	(F1)(E4)(F1)(E2) (E4)(E0)
0+ DDD Special Billing	(F1)(E0)

**Figure 4-1
NT AMA Call Record Format**

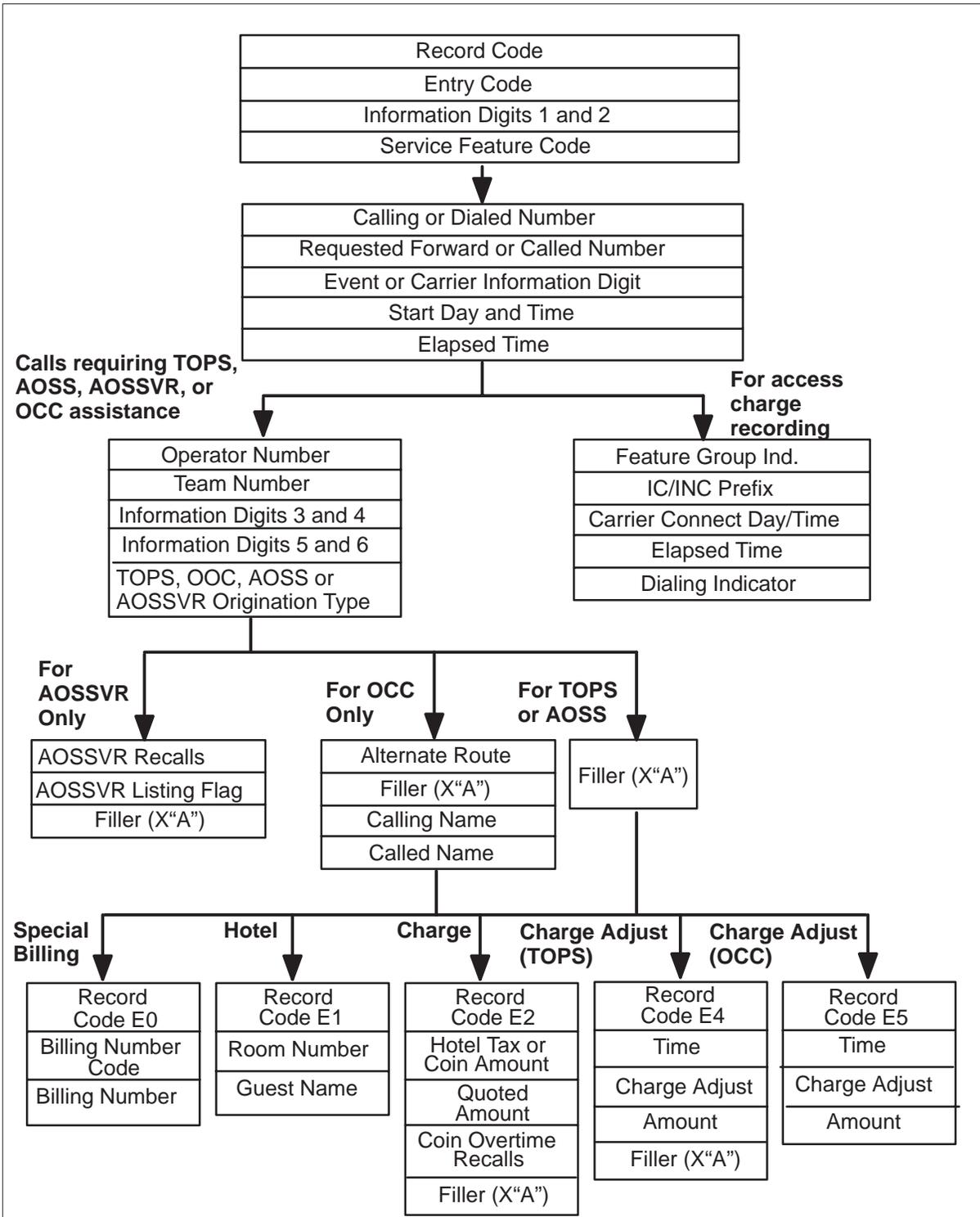


Table 4-1 NT AMA call record content (B0-B8 and F0-F3)													
Field Name	B0	B1	B3	B4	B5	B6	B7	B8	F0	F1	F2	F3	# of digits
Record Code	X	X	X	X	X	X	X	X	X	X	X	X	2
Entry Code	X	X	X	X	X	X	X	X	X	X	X	X	2
Info Digits 1-2	X	X	X	X	X	X	X	X	X	X	X	X	2
Service Code	X	X	X	X	X	X	X	X	X	X	X	X	2
Calling Number	X			X	X	X	X	X	X	X	X	X	10
Calling Number			X										18
Called Number	X	X		X	X	X	X		X	X	X	X	10
Called Number			X										18
Extra DDO Digits	X				X		X				X	X	5
Forward or requested number								X					10
Event Info Digit			X	X	X	X	X		X	X	X	X	1
Carrier Event Info	X	X											1
Start Day	X	X	X	X	X	X	X	X	X	X	X	X	3
Start Time	X	X	X	X	X	X	X	X	X	X	X	X	6
Elapsed Time	X	X	X	X	X	X	X		X	X	X	X	6
Out of Zone				X	X	X	X						1
RAO				X	X	X	X						3
800 Number Dialed				X	X	X	X						10
TOPS, OCC, and AOSS:													
Operator Number			X			X	X	X		X		X	4
Team Number			X			X	X	X		X		X	2
Info Digits 3-4			X			X	X	X		X		X	2
Info Digits 5-6			X			X	X			X		X	2
Origination Type			X			X	X	X		X		X	2
Alternate Route			X										3
Recalls								X					1
Listing Flag								X					3
—continued—													

4-6 NT AMA call record types

Table 4-1													
NT AMA call record content (B0-B8 and F0-F3) (continued)													
Field Name	B0	B1	B3	B4	B5	B6	B7	B8	F0	F1	F2	F3	# of digits
Filler X"A"			X		X	X	X	X			X	X	1
Calling Name (note 2)			X										40
Called Name (note 2)			X										40
Access Charge Recording:													
Feature Group Ind	X	X											1
IC/INC Prefix	X	X											4
Carrier Connect Day	X	X											3
Carrier Connect Time	X	X											6
Elapsed Time	X	X											6
Dialing Indicator	X												1
Digits/Record	70	54	15 6	58	64	70	76	52	44	56	50	62	
Notes:													
Note: For field descriptions, refer to Chapter 5.													
Note: Alpha characters = 2 digits, numeric = 1 digit.													
End													

Table 4-2					
NT AMA call record content (F4-F9)					
Field Name	F4	F5	F6	F8	# of digits
Record Code	X	X	X	X	2
Entry Code	X	X	X	X	2
Information digits 1-2	X	X	X	X	2
Service Code	X	X	X	X	2
Calling Number	X	X	X	X	10
Calling Number					18
Called Number	X	X	X		10
Called Number					18
Extra DDO Digits			X		5
—continued—					

Table 4-2						
NT AMA call record content (F4-F9) (continued)						
Field Name	F4	F5	F6	F8		# of digits
Forward or requested number				X		10
Event Information Digit	X	X	X			1
Carrier Event Information						1
Start Day	X	X	X	X		3
Start Time	X	X	X	X		6
Elapsed Time	X	X	X			6
Out of Zone						1
RAO						3
800 Number Dialed						10
TOPS, OCC, and AOSS:						
Operator Number				X		4
Team Number				X		2
Information Digits 3-4				X		2
Information Digits 5-6						2
Origination Type				X		2
Alternate Route						3
Recalls						1
Listing Flag						3
Filler X"A"			X	X		1
Calling Name						40
Called Name						40
Access Charge Recording:						
Feature Group Indicator						1
IC/INC Prefix						4
Carrier Connect Day						3
Carrier Connect Time						6
Elapsed Time						6
Dialing Indicator						1
—continued—						

4-8 NT AMA call record types

Table 4-2						
NT AMA call record content (F4-F9) (continued)						
Field Name	F4	F5	F6	F8		# of digits
Digits/Record	44	44	50	48		
Notes:						
<i>Note:</i> For field descriptions, refer to Chapter 5.						
End						

Table 4-3						
NT TOPS and OCC extension call record content						
Field Name	E0	E1	E2	E4	E5	# of digits
Record Code	X					2
Billing Number Code	X					1
Billing Number	X					19
Hotel:						
Record Code		X				2
Room Number		X				6
Guest Name (first four letters)		X				8
Charge:						
Record Code			X			2
Hotel Tax or Coin Amount			X			5
Quoted Amount			X			5
Coin Overtime Recalls			X			1
Filler X"A"			X			1
Charge Adjustment:						
Record Code				X	X	2
Time				X	X	4
Type				X		1
Type					X	2
Entry Code				X	X	2
Indicator				X	X	1
—continued—						

Table 4-3						
NT TOPS and OCC extension call record content (continued)						
Field Name	E0	E1	E2	E4	E5	# of digits
Amount				X	X	5
Filler X"A"				X		1
End						

NT AMA call record field descriptions

Fields Common to CAMA, LAMA, AOSS, AOSSVR, OOC and TOPS Calls

The following paragraphs contain descriptions by field name of the contents of call records which are common to record codes B0, B1, B3, B4, B5, B6, B7, B8, F0, F1, F2, F3, F4, F5, F6 and F8. See Table 5-1.

Record code

The code that identifies the record type is as follows:

Table 5-1 Record codes	
Record code	Record type
B0	Originating access charge record
B1	Terminating access charge record
B3	OCC handled
B4	800+ DDD
B5	800+ DDO
B6	800+ TOPS assisted domestic
B7	800+ TOPS assisted overseas
B8	AOSSVR
F0	DDD CAMA
F1	DDD TOPS assisted
F2	DDO CAMA
F3	DDO TOPS assisted
F4	DDD LAMA and LCDR
F5	INWATS and TERMBOPT
—continued—	

5-2 NT AMA call record field descriptions

Table 5-1 Record codes (continued)	
Record code	Record type
F6	DDO LAMA
F8	AOSSS
End	

Entry code

This two digit code with a value of 00 through 99 identifies the call type being recorded. Table 5-2 is a sample list of entry codes and the call type each represents.

Table 5-2 Entry codes	
Entry code	Call type
00	Station paid DDD (note 1)
01	Station paid LCDR
02-07	Reserved for special features
08	TWX
09	DATA
10-15	Reserved for special features
16	Timed message rate
17	Untimed message rate
18	Detailed message rate
19	Conference trunk usage
20	Station paid operator assisted
21	Station collect
22	Station special calling
23	Person paid
24	Person collect
25	Person special calling
26	Auto collect
27	Station special called
—continued—	

Table 5-2	
Entry codes (continued)	
Entry code	Call type
28	Person special called
29	Person call back (PCB)
30	PCB special billing
31-39	Not used
40*	Station paid DDO
41-55	Reserved for special features
56	Not used
57	Not used
58-59	Reserved for possible future use
60*	Station paid operator assisted
61*	Station collect
62*	Station special calling
63*	Person paid
64*	Person collect
65*	Person special calling
66*	Not used
67*	Station special called
68*	Person special called
69*	Person call back (PCB)
70*	PCB special billing
71-79	Not used
80	INWATS—measured time
81-83	Reserved for possible future use
84-89	Not used
90	Used by LAMA initial extension entry
91-95	Not used
96	Unspecified (default)
97	Cancelled call (domestic)
—continued—	

Table 5-2	
Entry codes (continued)	
Entry code	Call type
98	Cancelled call (overseas)
99	AMA test call
<p>Notes:</p> <p>Note: The entry code is always used for AOSS handled calls.</p> <p>Note: For DMS-100 and DMS-200, codes 00-99 are modifiable by the operating company. See Table TOLLENTC in 297-1001-451.</p> <p>Note: For DMS-200 TOPS, codes 00-19 can be modified by the operating company. Codes 20 through 99 are hard coded.</p> <p>Note: Codes 00-39 and 80-99 apply to LAMA.</p> <p>Note: For all loads, codes 40 through 79 are recorded on Log Report AMAB101 as DDO = Y.</p> <p>Note: Entry codes denoted with "*" are for international dialing.</p>	
End	

Information digits 1 and 2

These digits, each with a value of 0 through 7, provide call event information by means of a Yes/No system as follows (see note):

Note: The Y (yes) flag for each event is defined in Table 5-3.

Table 5-3										
Information digits 1 and 2										
Digit	Event	Value								
		0	1	2	3	4	5	6		7
1	Service analyzed?	N	Y	N	Y	N	Y	N	Y	note 1
	Charge?	N	N	Y	Y	N	N	Y	Y	notes 1, 2, 3
	Traffic sampled?	N	N	N	N	Y	Y	Y	Y	note 3
2	ANI fail?	N	Y	N	Y	N	Y	N	Y	note 4
	Operator dialed?	N	N	Y	Y	N	N	Y	Y	note 4
	Operator identified?	N	N	N	N	Y	Y	Y	Y	note 4
<p>Notes:</p> <p>Note: For AOSS, with this digit and event, only the values 0, 1, 2, and 3 are used.</p> <p>Note: For TOPS verification, only the values 0, 1, 4, and 5 are used since the verification record is no-charge.</p> <p>Note: For OOC, fields 0, 2, 4, and 6 are used.</p> <p>Note: For OOC, fields 0, 1, 2, 3, 4, and 6 are used.</p>										

Service feature code

This code consists of the two digits XY. The value for X represents the calling party service class, and Y represents the called party service class. Both X and Y can mean any one of the following:

Table 5-4 Service feature codes		
Value	Meaning	Notes
0	Default	1
	Non-coin or default	2,3
1	Coin	2
2	Hotel/motel	2
3	Picturephone	4
4	Dataphone	
5	3-way calling	5
6	Conference calling	5
7	Call forwarding	5
8	Mobile	6
9	Marine	6
Notes: Note: The service feature code is always used for INWATS calls Note: The code is applicable to AOSS calling party service class. Note: It is always used for AOSS called party service class. Note: The service feature code is not currently available. Note: It is applicable to LAMA offices only. Note: Applicable to OOC only.		

Calling number

The calling number is a 10-digit number consisting of the Numbering Plan Area (NPA) code as determined by trunk translations, the NXX of the ANI spill, and the Directory Number (DN) of the calling party. The calling number is recorded on all AMA billed calls. If CAMA suspension is in effect, the calling number is zeroed on ONI and ANI fail calls.

For OOC, this number can be a maximum of 18 digits and can contain alphanumeric characters. Alphabetic characters require two digits and numeric characters require one digit.

For INWATS calls this number is the special billing number associated with the called line since the calling number is seldom known.

For AOSS calls the recorded digits in this field are based on the ANI spill received from the end office or on the digits keyed by the operator in the event of ANI failure and calls requiring ONI. In either case the NXX is found in Table AOSSBC in order to derive the the actual NPA-NXX to be written onto the AMA file.

For TOPS verification this field identifies the calling number associated with the verification attempt being recorded. If a calling number never existed or is no longer connected, this field is left blank.

For DMS-250 TOPS this field is reassigned as the Authorization Code Field of the originating party. See “TOPS and OCC extension records” on Page 5-18. Whenever the authorization is less than ten digits it is left padded with zeros.

Called number

The called number consists of up to 15 digits and identifies such numbers as the DN as dialed by the calling party, the pilot DN, the received DN, or in the case of INWATS terminating calls, the corrected DN.

The NPA code is not shown if it was not dialed and is identical to the NPA of the calling party. With LAMA billing the NPA code is always shown. If the NPA is not recorded, the field is filled with A's in order to maintain the correct number of characters.

For OOC, this number can be a maximum of 18 digits and can contain alphanumeric characters. Alphabetic characters require two digits and numeric characters require one digit.

For verification records this field contains the number being verified as keyed in by the operator.

The SRC+NXX+XXXX will be replaced by 800+NXX+XXXX in this field whenever an 800+ Southbound call is made. Full ANI may not be available unless the Service Switching Point (SSP) also is the serving CAMA office for the originating call.

Note: 1 The alignment of the called number is as follows:

- For record type F0 (and B4) it depends on the originating trunk group. If the call originates on a TOPS trunk group, left alignment prevails; otherwise, it is right-aligned.
- For record types B3, B8, F1, F3, and F8, the called number is left-aligned.
- For record types B5, F2, F4, F5, and F6, the called number is right-aligned.
- In all cases padding with A's as fillers is provided.

Note: 2 For records B4, B5, B8, F0, F1, F4, and F8 the number of digits recorded can be 7 or 10.

Note: 3 For B6 records, 10 digits are recorded.

Note: 4 For records B7, F2, F3, and F6, up to 15 digits can be recorded.

Note: 5 For B3 records, up to 18 digits can be recorded.

Event information digit

This digit provides information about certain events that have occurred during the call as shown in Table 5-5.

Table 5-5 Event information									
Meaning	Value								
	0	1	2	3	4	5	6	7	8
Answer	Y	Y	N	N	Y	Y	N	N	N
Calling party disconnect	Y	N	Y	N	Y	N	Y	N	Y
Called party disconnect	N	Y	N	Y	N	Y	N	Y	N
Blue box fraud	N	N	N	N	Y	Y	Y	Y	N
Blocked	N	N	N	N	N	N	N	N	Y

Note: 1 Each value (0 through 8) of the event information digit represents a given combination of events. For example a value of 1 implies the following:

- Answer Timing was successful.
- Called party disconnected timing was successful.
- Called party disconnected before calling party.
- Call was not blocked.
- Use of a fraudulent device was not detected.

Start time

The record in this field contains one of the following:

- **Answered Calls:** identifies the date and time at which the called party answer timing is completed (valid answer signal detected).
- **Unanswered Calls:** identifies the date and time at which the initial trunk seizure, incoming on CAMA calls and outgoing on LAMA calls, occurred.
- **AOSS Calls:** identifies the date and time of the call arrival at the AOSS position.
- **TOPS Verification:** identifies the date and time of the call arrival at the TOPS position.

The 9 digit Time record contains the following information:

- Day in year: 001-366
- Hour: 00-59
- Minute 00-59
- Second 00-59

Elapsed time

The record in this field of 6 digits contains one of the following:

- **Answered Calls:** identifies the total conversation time in seconds.
- **Unanswered Calls:** Always zero. See Figure 5-1 on page 5-9 and Table 6 on page 5-10.
- **Long Duration Calls:** See Chapter 6.
- **TOPS Verification:** field represents the number of seconds that the operator was attached to the forward (called number). If the forward party was not reached, this field represents the time from outpulsing to position release or release forward.

Note: Feature AN0319 provides a better method for determining the elapsed time of a billable call by eliminating peripheral timing and forcing the use of CC timing. Prior to this feature, elapsed time was determined by the peripheral or CC. The peripheral determined the elapsed time of the call and included the time in the disconnect message sent to the CC. By using CC timing, the answer timestamp and disconnect timestamp are determined by the CC. The answer timestamp is subtracted from the disconnect timestamp to determine the elapsed time of a call, when a call disconnects.

Out of zone

This field is one character in length and is obtained as part of the routing component returned from the database.

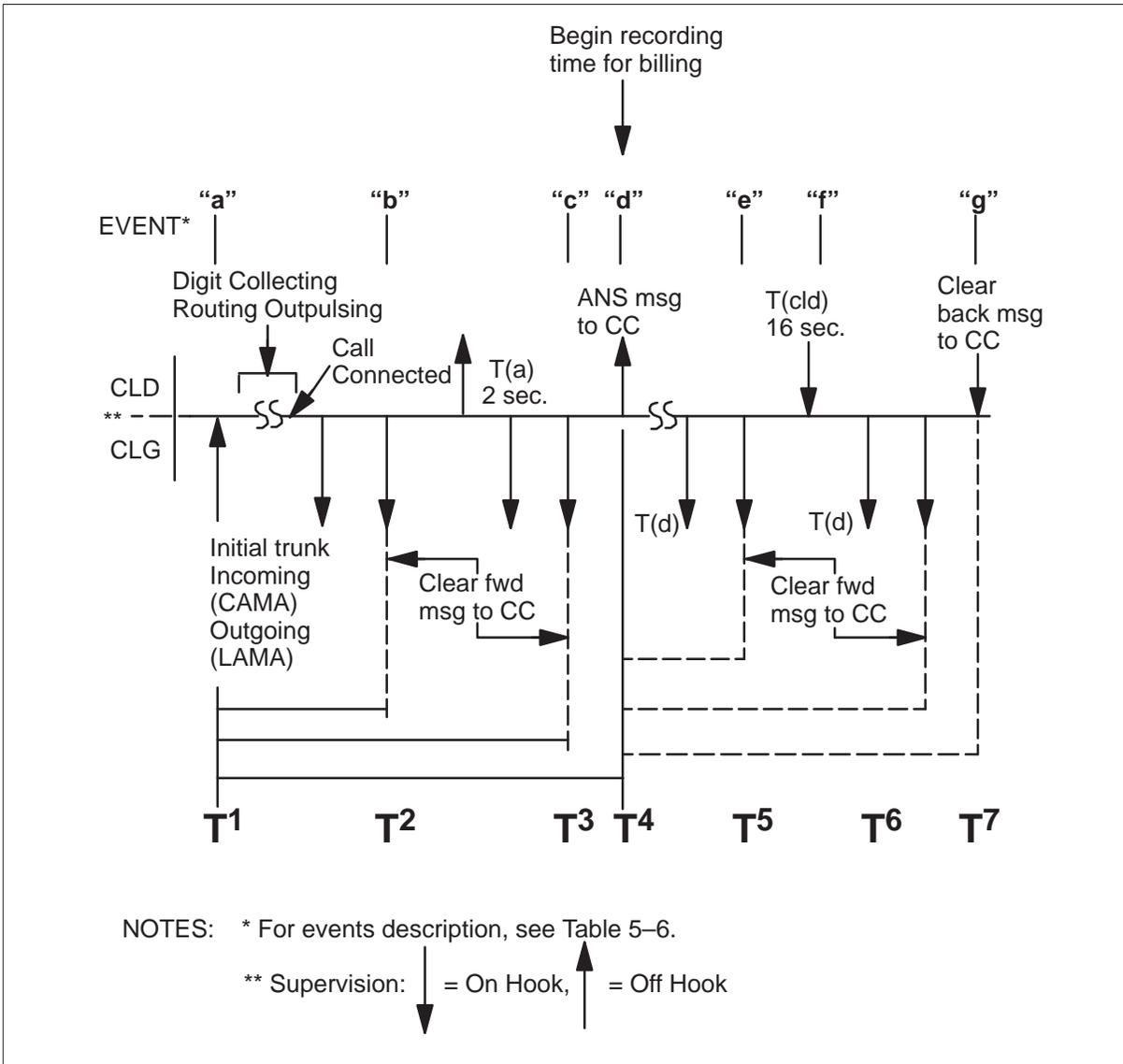
Revenue office accounting code

The record in this field of 6 digits is obtained as part of the routing component returned from the database.

800 number dialed

The record in this field of 10 digits is obtained through standard AMA processing.

Figure 5-1
AMA Call Analysis



5-10 NT AMA call record field descriptions

Table 5-6 AMA call event description							
Event		MCC	ETMEQ	ANS	EID	ANSB	ETIME
"a"	Initial Trunk Seizure						0 (note 6)
"b"	CLG DISC prior to CLD ANS	C-F	T ² -T ¹	False	2 (note 2)		0
"c"	CLG DISC during CLD ANS timing (notes 1, 3)	C-F	T ³ -T ¹	False	2 (note 2)		0
"d"	Answer timing OK	ANS	T ⁴ -T ¹	True			0
"e"	CLG DISC after CLD ANS	C-F	T ⁵ -T ⁴	True	0	from Event "d"	T ⁵ -T ⁴ +T(a)
"f"	CLG DISC after CLD ANS	C-F	T ⁶ -T ⁴	True	0	from Event "d"	T ⁶ -T ⁴ +T(a)
"g"	CLG DISC after CLG ANS	C-B	T ⁷ -T ⁴	True	1	from Event "d"	T ⁷ -T ⁴ +T(a) -T(CLD)
Legend:							
ANS = Answer							
ANSB = Answer (for billing)							
CLD = Called							
CLG = Calling							
CT = Conversation Time							
C-B = Clear-back							
C-F = Clear-Forward							
DISC = Disconnect							
MCC = Message to CC							
EID = Event Information Digit (for billing)							
ETIME = Elapsed Time (for billing)							
ETMEQ = Elapsed Time Equals							
T = Global PM Timer							
T(a) = Answer Timer (MINIMUM_CHARGE_DURATION) (note 4)							
T(cld) = CLD DISC Timing (Long or SHORT TIMED_RELEASE_DISC_TIME) (notes 4, 5)							
T(d) = CLG DISC Timing							
'T(CLD) = Correction of T(cld) (DISC_TIME_BILLED) (notes 4, 5)							
Notes:							
Note: Billing entry is optional							
Note: NT AMA only							
Note: Event represents SST in BC							
Note: Parameter of Table OFCENT, see text for values.							
Note: A NO value for DISC_TIME_BILLED causes the system to leave timing as is; that is, no subtraction of T(cld).							
Note: The time between events "a" and "d" is not recorded for billing purposes.							

TOPS and OOC handled calls only

The following are those entries which are unique to TOPS and OOC and form an integral part of record types B3, B6, B7, F1, and F3 only. See Figure 5-1.

Operator number

This four digit code defines the assigned number of the TOPS or OOC operator handling the call or verification attempt.

Team number

This two digit code defines the team to which the TOPS or OOC operator is assigned.

Information digits 3, 4, 5, and 6

These digits, each with a value of 0 through 7, provide additional call event information by means of a Yes/No system as shown in Table 5-7 (see note).

Note: The Y(yes) flag for each event is defined in Table 5-21.

NT AMA records produced for any call taken down by the position sanity timer are affected. The sanity timer is activated when all subscribers attached to an operator position have gone on-hook. The timer is intended to take down calls in situations where the operator has abandoned the call. The timer is set to a value of from 1 to 60 minutes. If the subscriber remains on-hook and the timer expires, the call will be taken down.

The end of the TOPS call will produce an AMA record. Since the operator abandoned the call, the AMA record will show that the call is non-chargeable. When the call is taken down due to expiration of the sanity timer and NT AMA is in use by the office, Information Digit #5 will be set to either 2 (Automatic No AMA) or 3 (Automatic No AMA + Dial Rate Key). See Table 5-7.

Table 5-7 Information digits 3, 4, 5, and 6										
Digit	Event	Value								
		0	1	2	3	4	5	6	7	
3	No Connect?	N	Y	N	Y	N	Y	N	Y	
	Verification request?	N	N	Y	Y	N	N	Y	Y	
	Validity check failure or security?	N	N	N	N	Y	Y	Y	Y	note 1
4	Trouble report?	N	Y	N	Y	N	Y	N	Y	
-continued-										

Table 5-7										
Information digits 3, 4, 5, and 6 (continued)										
Digit	Event	Value								
		0	1	2	3	4	5	6		7
	Charge adjust?	N	N	Y	Y	N	N	Y	Y	
	Local call?	N	N	N	N	Y	Y	Y	Y	
5	Dial Rate key?	N	Y	N	Y	N	Y	*	*	note 2
	Automatic No AMA?	N	N	Y	Y	N	N	*	*	
	No AMA key?	N	N	N	N	Y	Y	*	*	
6	Call transfer?	N	Y	N	Y	N	Y	N	Y	
	Cancel timing?	N	N	Y	Y	N	N	Y	Y	
	Cancel call?	N	N	N	N	Y	Y	Y	Y	
Notes: Note: When forced F1 and F3 records are produced, values 4 through 7 of the validity check failure portion of digit 3 indicate that a validity check failure or an overwrite event occurred. The validity check failure, unlike the overwrite, forces an E0 extension record. Note: "*" denotes NOT APPLICABLE.										
End										

Originating type

This is a two digit code indicating how a call originates to a TOPS or OOC operator. The types currently in use and their corresponding codes are as follows:

Table 5-8	
Originating type codes	
Type code	Call type
00	Not used
01	1+ (011+)
02	0+ (01+)
03	0
04	RONI
05	ALM
06	INTC
07	1153 (Marine)
—continued—	

Table 5-8	
Originating type codes (continued)	
Type code	Call type
08	141 (Rate and route)
09	MOBILE
10	121
02-07	Reserved for special features
11-19	Reserved for future use
20	131
21-29	Reserved for future use
30	181
31-39	Reserved for future use
40	1150
41	Reserved for future use
42	1152 (Mobile)
43-49	Reserved for future use
50	1155
51-59	Reserved for future use
60	1156
61	Reserved for future use
62	1158
63	1159
64-69	Reserved for future use
70	Delay calls
71	Reserved for future use
72	OOB 151 (No AMA)
73	OOB 801 (No database involvement)
74	OOB database (Automatic)
75	OOB Manual
76	OOB 801 (Database involvement)
77-79	Reserved for future use
—continued—	

Table 5-8	
Originating type codes (continued)	
Type code	Call type
80	Coin recalls
81-88	Reserved for future use
89	411
90	555 (Universal information)
91-99	Reserved for future use
End	

Alternate route

This is a three digit field that contains the alternate route if used by a call. If more than one alternate route was attempted, the last route is recorded. Alternate Route will be blank if no alternate routes were attempted.

Calling name

This is a 40-digit field that contains the name of the calling party. Alphanumeric characters can be recorded with alphabetic characters requiring 2 digits and numeric characters requiring 1 digit.

Called name

This is a 40-digit field that contains the name of the called party. Alphanumeric characters can be recorded with alphabetic characters requiring 2 digits and numeric characters requiring 1 digit.

AOSS and AOSSVR Handled Calls Only

The following are those entries which are unique to AOSS and AOSSVR and which form an integral part of Record Types F8 and B8. See Figure 4-1.

Requested or forward number

This field, used with AOSS or AOSSVR handled calls, identifies the directory or forward number keyed by the operator. The field is left blank unless the forward number has been keyed in or call is chargeable.

AOSS operator number

This four digit code defines the assigned number of the AOSS or AOSSVR operator handling the call.

AOSS or AOSSVR team number

This two digit code defines the team to which the AOSS or AOSSVR operator is assigned.

Information digits 3 and 4

These digits, each with a value of 0 through 7, provide additional call event information as shown in Table 5–9.

Table 5–9 Information digits			
Digits	Event condition	Value	
3	Auto-charge “NO CHG” not keyed	0	note 1
	Auto-charge “NO CHG” not keyed	1	
	Auto-charge “NO CHG” keyed	2	
	Auto-charge “NO CHG” keyed	3	
	Auto-charge “VR” keyed, but subscriber disconnect before connection to an ARU	4	
	Auto-no charge “VR” keyed, but subscriber disconnect before connection to an ARU	5	
4	Default	0	note 2
	Transferred call (TC)	1	
	Trouble reported (TR)	2	
	Combined TC and TR	3	
Notes:			
Note: This digit identifies if the call was initially chargeable and if the NO CHARGE key was subsequently depressed. A chargeable call may be made non-chargeable; however, a call that is non-chargeable cannot be made chargeable.			
Note: This digit identifies if the call arrived at the AOSS position as a transferred call and if a trouble was reported on the call.			

AOSS originating type

Type This two digit code indicates how a call originated to an AOSS operator. The types currently in use and their corresponding codes are as follows:

Table 5–10 AOSS originating types	
Type code	Call type
00	Unspecified
01	Local DA 411
02	HNPA DA 1+555+1212
03	FNPA DA 1+NPA-555-1212
—continued—	

Table 5-10 AOSS originating types (continued)	
Type code	Call type
04	131 Assistance from AOSS operator
05	141
06	Intercept
07	ACS keyed by operator to forward a number
08	Reserved for future use
09	Reserved for future use
10	Reserved for future use
End	

AOSSVR handled calls only

The following are those entries which are unique to AOSSVR and form an integral part of Record Type B8. See Figure 5-1.

AOSSVR recalls

This one digit field indicates whether the call became a recall to the operator, a cut-through to the operator, or neither a recall or cut-through. The digits that can be recorded in this field and their meanings are shown in Table 5-11.

Table 5-11 AOSSVR recall codes	
Recall code	Description
0	Call was not a cut-through or recall
1	Call was recalled to the operator
2	Call was cut-through to the operator

AOSSVR listing flag

This three digit field determines downstream charge determination. The values for this field range from 0 to 255.

Access charge recording

The following entries are unique to and form an integral part of the originating and terminating ACR record types B0 and B1.

The B0 record is similar to the F4 record and is used in the recording of calls accessing an OCC, while the B1 record is used to record calls arriving from

an OCC. Essentially the records are the same except that the calling number, dialing indicator, and ANI flag are not present in the B1 record.

The following paragraphs describe the contents of each of the ACR fields in the sequence illustrated in Figure 4-1.

Carrier event information digit

This digit follows the called number field and provides information about certain events that have occurred during the call as shown in Table 5-12.

Table 5-12 Carrier event information digit	
Meaning	0 1 2 3 4 5 6 7 8 9 A B C D E F
Answer	Y Y N N Y Y N N Y Y N N Y Y N N
Calling party disconnect	Y N Y N Y N Y N Y N Y N Y N Y N
Called party disconnect	N Y N Y N Y N Y N Y N Y N Y N Y
Routing (tandem)	N N N N Y Y Y Y N N N N Y Y Y Y
ANI	N N N N N N N N Y Y Y Y Y Y Y Y

Notes:
Note: Each value (0 through F) of the event information digit represents a given combination of events. For example, a value of D implies the following:

- Answer timing was successful
- The called party disconnected before calling party
- The called party disconnect timing was successful.
- The call was routed through a tandem office; N (no) would indicate an end office.
- The calling number was spilled to the OCC; N would indicate it was not.

Feature group indicator

The Feature Group (FG) indicator is a single digit signalling the FG type of the call being recorded as follows:

Table 5-13 Feature group indicator	
Digit	Meaning
1	FGB (950-10xx dialed)
2	FGD Equal access

IC/INC prefix

This is a four digit field. The first three digits indicate the 0xx of the 950-10xx code, and the last digit indicates how the prefix was found as follows:

Table 5-14 IC/INC prefix	
Digit	Meaning
0	Prefix not available (FGB terminating ACR only)
1	Prefix taken from dialed digits
2	Prefix derived from trunk group data

Carrier connect day

This is a three digit code with a value range of 001–366. This indicates the day on which carrier connect occurred. Carrier connect is when the start dial wink is received from the OCC.

Carrier connect time

This field identifies the time of day that carrier connect took place. The values are as follows:

- Hour: 00–23
- Minute: 00–59
- Second 00–59.

Elapsed time

This six digit field indicates the total elapsed time in seconds from carrier connect to disconnect.

Dialing indicator

This single digit field on the B0 record only identifies what dialing pattern was used by the originating customer as shown in Table 5-15.

Table 5-15 Dialing indicator	
Digit	Meaning
1	PIC was dialed, not 10xx or 10xxx
2	10xx or 10xxx was dialed
3	950-10xx was dialed

TOPS and OOC extension records

The following paragraphs describe the content by field name of each of the TOPS and OOC extension call record types. See Figure 4-1.

Special billing

Special billing makes it possible for customers to bill long distance calls to a third number or to a valid domestic or overseas Operating Company credit card, including DMS-250 TOPS handled calls with authorization codes.

The following is a description of the Special Billing record entries:

- **Extension Record Code:** This is a two digit hexadecimal code (“E0”) used to identify the record.
- **Billing Number Code:** This is a single digit that identifies the type of billing number being recorded, as follows:

Call type	Code	Description
DMS-100 TOPS and OCC	0	Domestic 3rd number
	1	Domestic credit card
	2	Overseas 3rd number
	3	Overseas credit card
	4	ACCS or MCCS record
	6	Special billing number (OCC)
DMS-250 TOPS	0	Unassigned
	1	Calling card billing
	2	Unassigned
	3	A250 ANI billing

- **Billing Number Field—DMS-200 TOPS and OOC:** This field consists of a group of up to 19 characters, representing the number to which the call is to be billed. All billing numbers are left-aligned and contain A’s as fillers where required in order to maintain the correct field size.

The formats of the various billing types are as follows:

- Domestic 3rd—This billing number is numeric, and usually consists of seven or ten digits.
- Domestic Credit Card—This billing number field consists of fourteen numerics. For OOC E0 extension records, the first 10 digits contain the credit card number, followed by the three digit Revenue Accounting Office (RAO) code returned by the Services Database (SDB) system, and an information digit that is interpreted as follows:
 - 1 – SDB queried, number valid

- 3 - SDB queried, number invalid
- 5 - SDB not queried

If the database has not been queried, the RAO will have a value of "000".

- Overseas 3rd—This billing number field prefixed by billing code 2 consists of a three digit country code (two digit codes have a prefixed 0, such as 033) followed by a variable number of numeric digits.
- Overseas Credit—The overseas credit card field has the following format:
 - A three digit country code (two digit codes have a prefixed digit 0, such as 033) is followed by an alpha character.
 - A variable number of numerics starts in the next position followed by filler characters (A's).
 - The last four characters in the field, if used, represent the last two alpha characters in the French credit card.
- Operator assisted MCCS or ACCS—The billing number consists of the credit card number, usually ten digits, followed by the three digit Revenue Accounting Office (RAO) code returned from the Billing Validation Center (BVC) or Service Database System (SDB), and an information digit that is interpreted as follows:
 - 0—BVC validated, customer dialed
 - 1—BVC validated, operator assisted
 - 2—BVC failure, customer dialed
 - 3—BVC failure, operator assisted
 - 4—SDB not accessed, customer dialed
 - 5—SDB not accessed, operator assisted.

BVC validated indicates that the calling card has been successfully validated by a direct signalling query to the BVC, and a valid RAO is present. Otherwise BVC failure is implied and the RAO has a value of 000.

- Special Billing Number (OOC)—used on calls that originate overseas or domestically and are billed to a domestic number. This billing number field consists of fourteen numerics.

Note: 1 Provision is made to include the proposed new credit card format for Auto Billing Calling (ABC).

Note: 2 Alpha characters are represented by two hexadecimal digits, such as A = C1, B = C2, as defined on Page 5-21. The billing number code indicates the format of the special billing number and the position of the alpha characters.

- **Billing Number Field—DMS-250 TOPS:** For DMS-250 TOPS handled calls, this field is divided into an ID field and an Authcode field as follows:
 - ID Field: This field of two digits, used with DMS-250 TOPS handled calls, represents the type of authorization and account code that was passed in the A250 ANI spill as shown in Table 5-17.

ID digits	Digits in Authcode	Digits in Account code
02	ANI fail	ANI fail
50	5	0
52	5	2
53	5	3
60	6	0
62	6	2
63	6	3
70	7	0
72	7	2
73	7	3

- Authcode Field A250 Billing: This field of 17 characters, used with DMS-250 TOPS handled calls, defines the credit card billing number or authorization code and is determined by ID field as follows:
 - A250 ANI Billing—This contains the authorization code passed in the A250 ANI spill and is left padded with zeros if required.
 - Calling Card Billing—This contains the credit card number as input by the operator and is left padded with zeros if required.

Hotel

This record is used whenever chargeable calls are originated from Hotels. Following is a description of the TOPS Hotel Extension Record entries:

- **Extension Code:** This two digit hexadecimal code (“E1”) is used to identify the record.
- **Room Number:** This six digit number is entered by the TOPS operator, left aligned, and padded with filler characters as required. It may include up to six numerics or three alpha characters or a mix providing the total does not exceed six hexadecimal digits. Possible formats for the room number field are shown in Table 5-18 (see notes).

Note: 1 The letter X in Table 5-18 represents a single-digit number from 0-9.

Note: 2 The letter A in Table 5-18 represents an alpha character that is represented by two hexadecimal digits (hh=A) as follows:

A = C1 G = C7 L = CD Q = D4 V = D9
 B = C2 H = C8 M = CE R = D5 W = DB
 C = C3 I = C9 N = D1 S = D6 X = DC
 D = C4 J = CB O = D2 T = D7 Y = DD
 E = C5 K = CC P = D3 U = D8 Z = DE
 F = C6

Table 5-18 Room number field—possible formats			
Format 1	Format 2	Format 3	Format 4
X	A	A	XA
XX	AA	AAX	XAX
XXX	AAA	AAXX	XAXX
XXXX	AX	AXA	XXA
XXXXX	AXX	AXAX	XXAX
XXXXXX	AXXX	AXXA	XXXA

- **Guest Name:** This code holds up to four letters (8 digits) of a guest's name in the following format:

AAAA

See note 2 on page 5-22.

Charge

The following is a description of the charge extension record entries:

- **Extension Code:** This two digit hexadecimal code ("E2") is used to identify the record.
- **Hotel Tax or Coin Amount:** This five digit field contains one of the following:
 - Hotel Tax—the amount of tax applicable, as calculated by the system for the call
 - Coin Amount—the amount actually deposited by the customer.

If there is a change in billing, this field contains the charge up to change in billing.
- **Quoted Amount:** This 5 digit field contains one of the following:
 - Amount for Hotel call (excluding tax)

— Amount quoted in dollars and cents if call is Time and Charges (T&C).

- **Coin Overtime Recalls:** This single digit field represents the total number of overtime recalls on a coin call (excluding notifies (NFY) and initial period (INP) deposits).
- **Filler character X“A”:** This single hexadecimal character is used to build-out the record to the required number of digits.

Charge adjust (TOPS)

A subscriber desiring an adjustment to the charges on a previously made call (because of poor transmission or a cut-off, for example) can dial the appropriate code to reach a TOPS operator who keys in the necessary information.

The AMA file entries for a charge adjust consist of the following:

- a call record format F1 or F3 detailing the information of the call to be adjusted as keyed in by the operator
- an extension call record format (E4) detailing the adjustment.

The downstream process uses the F1/E4 or F3/E4 call records to find the data pertaining to the call to be adjusted and carries out the adjustment following Operating Company procedures.

The following is a description of the Charge Adjust Extension Record for TOPS:

- **Extension Code:** This two digit hexadecimal code (“E4”) is used to identify the record.
- **Time:** This field gives the approximate time in hours and minutes of the call requiring the adjustment as provided by the operator. If no such time is provided, system time is recorded in this four digit field.
- **Charge Adjustment Type:** This single digit code (0-9) input by the TOPS operator defines the type of charge adjustment.

Since this code is only used by downstream processing, it is modifiable by the Operating Company and could comprise that shown in Table 5-19.

Table 5-19 Charge adjustment codes	
Code	Reason for charge adjustment
0	Wrong number
1	Cancel previous charge adjust
—continued—	

Table 5-19 Charge adjustment codes (continued)	
Code	Reason for charge adjustment
2	Poor transmission
3	Vacant
4	Vacant
5	Cut off
6	Manually rated
7	change billing
8	Coin under collect
9	Coin over collect
End	

- **Charge Adjustment Entry Code:** Original Entry Code: If no change in billing has occurred, the entry code provided is identical to the entry code in the initial billing record and consists of two digits.
- **Charge Adjustment Indicator:** This single digit indicates how credit is to be applied.
 - 0 = no indicator provided
 - 1 = minutes to be credited
 - 2 = dollars and cents to be credited
 - 3 = entire call to be credited.
- **Charge Adjustment Amount:** This field consists of five digits and can be entered as one of the following:
 - In cents, 00001-65536
 - In minutes, 00-99, followed by fillers such as A's.
- **Filler character X“A”:** This single hexadecimal character is used to build-out the record to the required number of digits.

Charge adjust (OOC)

A caller desiring an adjustment to the charges on a previously made call can request that the OOC operator key in the necessary information.

The AMA file entries for a charge adjust consist of the following:

- a call record format B3 detailing the information of the call to be adjusted as keyed in by the operator
- an extension call record format (E5) detailing the adjustment.

The downstream process uses the B3/E5 call record to find the data pertaining to the call to be adjusted and carries out the adjustment following Operating Company procedures.

The following is a description of the Charge Adjust Extension Record for OOC:

- **Extension Code:** This two digit hexadecimal code (“E5”) is used to identify the record.
- **Time:** This field gives the approximate time in hours and minutes of the call requiring the adjustment as provided by the operator. If no such time is provided, system time is recorded in this four digit field.
- **Charge Adjustment Type:** This 2-digit code (00–99) input by the OOC operator indicates the reason for the charge adjust entry.
- **Charge Adjustment Entry Code:** Originating Entry Code: This 2-digit field is used to indicate how a call was billed. The digits used are as follows:

Table 5-20 Charge adjustment entry codes	
Code	Adjust originating code
60	Overseas station call (STA PD, STA COL, STA SPL CLG, STA SPL CLD)
63	Overseas station call (PER PD, PER COL, PER SPL CLG, PER SPL CLD, PCB PD, PBC SPL CLD)
96	Unspecified

- **Charge Adjustment Indicator:** This single digit indicates how credit is to be applied.
 - 0 = no indicator provided
 - 1 = minutes to be credited
 - 2 = dollars and cents to be credited
 - 3 = entire call to be credited.
- **Charge Adjustment Amount:** This field consists of five digits and is entered as one of the following:
 - In cents as— 00001–65536
 - In minutes as— 00–99 followed by fillers (A’s)

Table 5-21 Definition of information digits	
Event	Definition of YES flag (see note 1)
ANI FAIL?	The ANI spill was not available from the local office. The ANI fail could come as part of the ANI spill or by the toll office receiving mutilated digits from the connected end office. See Note 2.
Automatic No AMA?	An automatic No AMA condition is in effect as determined by the system. For example: Call to Inward (121) Call to supervisor (ASST POS) OGT KEY, if so indicated in Table OGTKEY Flag can be reset by operation of the NO AMA key. In this case, the NO AMA Key flag also remains unset. See Note 3.
Cancel Call?	Cancel Call (CA CALL) key was operated prior to position release. Flag is not reversible.
Cancel Timing?	Cancel Timing (CA TMG) key was operated and was in effect at position release. Condition can be reset upon subsequent operation of another timing key.
Charge?	Call originated on a chargeable route. A (NO) appears if call was on a charge adjust or HOT list match of numbers in Table HOTLIST.
Charge Adjust?	The CHG ADJ key was operated as part of the KP CHG ADJ + Codes + ST keying sequence. Charge adjust forces an AMA record to tape. Flag is not reversible.
Dial Rate?	At time of position release dial rate was in effect. Flag is reset with each operation of Dial Rate Key.
Local?	Operator screening identified the call as local. For this flag to be set the forward connection must be established by the operator. Flag is not reversible even if a subsequent connection to a toll number is made.
No AMA Key?	The TOPS operator has determined that a NO AMA condition exists and has operated the NO AMA KEY; however, an AMA record is produced. The flag can be reset by re-operating the NO AMA key. See Note 3.
—continued—	

Table 5-21	
Definition of information digits (continued)	
Event	Definition of YES flag (see note 1)
No Connect?	<p>The NO CONN key was operated as part of the following key sequences:</p> <p>KPBACK + digits + NOCONN + ST KPFWD + digits + NOCONN + ST KPOVS + digits + NOCONN + ST</p> <p>Input of calling or called number was permitted but routing was prevented. Routing is established with second operation of ST key. The flag is set whether a subsequent connection is made or not. Flag is not reversible.</p>
Operator Dialed?	The forward connection was established by the operator, such as KP FWD + digits + ST or RLS FWD + ST. This flag is not reversible after the operation of the START key.
Operator Identified?	Call originated as ONI either as an inter-toll origination or from an incoming trunk marked ONI. See Note 2.
Service Analyzed?	The call was selected by the switch for service analysis. It is not an indication of the service observed identifier forming part of the ANI spill.
Traffic Sampled?	Call is being traffic sampled by the switch. The rate of sampling is defined by the Operating Company in Table TRAFSAMP. The flag is set if the call is traffic sampled and routed to the operator position.
Transferred Call?	The call was originated as a transferred call. This flag is not set in the transferred-from call.
Trouble?	A trouble report has been keyed into the system by the operator using the KP TRBL + code + ST sequence. Flag is not reversible.
Valid Chk Fail?	The flag is automatically set whenever a match between a domestic third party or credit card number (including ten and 14 digit special billing numbers) and the HOT list occurs. A Hot List match forces an AMA record to tape. Flag is not reversible.
—continued—	

Table 5-21																																													
Definition of information digits (continued)																																													
Event	Definition of YES flag (see note 1)																																												
Verification Request?	The KP VFY key was operated whether or not a barge-in connection was made. Flag not reversible.																																												
<p>Notes:</p> <p>Note: Each information digit may have a value of 0 through 7. The value represents a set of Y (yes) and N (no) flags for the events associated with the information digit in question. For example, if a call is not service analyzed but is chargeable and traffic sampled, a value of 6 is given to the Information Digit 1 as follows:</p> <table border="1"> <thead> <tr> <th>Digit</th> <th>Event</th> <th>Value</th> <th>0</th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> <th>5</th> <th>6</th> <th>7</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Service Observed?</td> <td></td> <td>N</td> <td>Y</td> <td>N</td> <td>Y</td> <td>N</td> <td>Y</td> <td>N</td> <td>Y</td> </tr> <tr> <td></td> <td>Charge?</td> <td></td> <td>N</td> <td>N</td> <td>Y</td> <td>Y</td> <td>N</td> <td>N</td> <td>Y</td> <td>Y</td> </tr> <tr> <td></td> <td>Traffic Sampled?</td> <td></td> <td>N</td> <td>N</td> <td>N</td> <td>N</td> <td>Y</td> <td>Y</td> <td>Y</td> <td>Y</td> </tr> </tbody> </table> <p>Note: ANI fail and operator identified are mutually exclusive; they cannot both be set to Y (yes) at the same time.</p> <p>Note: The automatic NO AMA and the NO AMA KEY flags are mutually exclusive; they cannot both be set at the same time.</p>		Digit	Event	Value	0	1	2	3	4	5	6	7	1	Service Observed?		N	Y	N	Y	N	Y	N	Y		Charge?		N	N	Y	Y	N	N	Y	Y		Traffic Sampled?		N	N	N	N	Y	Y	Y	Y
Digit	Event	Value	0	1	2	3	4	5	6	7																																			
1	Service Observed?		N	Y	N	Y	N	Y	N	Y																																			
	Charge?		N	N	Y	Y	N	N	Y	Y																																			
	Traffic Sampled?		N	N	N	N	Y	Y	Y	Y																																			
End																																													

Special NT AMA features

Mechanized calling card service (MCCS)

In offices equipped with feature NTX170 the Operating Company is able to provide operator assisted MCCS.

MCCS enables a subscriber to make a chargeable long distance call using a credit card by entering the special billing information without the assistance of an operator.

Where MCCS is provided, the subscriber receives a prompt tone or an announcement indicating the toll office is ready to receive the DTMF digits of the credit card number. At this point a subscriber electing to have assistance may reach the operator by one of the following actions:

- do nothing and time out occurs
- dial “0” (DTMF only)
- flash switch-hook

Assuming it is a MCCS call, the operator keys in the appropriate calling card number. A validity check is made through the BVC, and the call is allowed to complete or is denied.

The AMA recording of such operator assisted MCCS calls is made using record “E0” as defined on page 5-18.

Record of TOPS billing number changes

In offices equipped with feature package NTX030CD records are produced whenever an overwrite of the forward number on a domestic or overseas call by a TOPS operator takes place.

Overwriting of a forward number on domestic calls is always permitted and is recorded if the overwritten number is or has been involved in a network connection, and the new number is never involved in a network connection.

On overseas calls overwriting of a connected forward number is only allowed if both numbers have the same country code or if the number to be overwritten is an operator code.

Overwriting of a forward number is recorded using a single forced AMA record, either F1 for domestic or F3 for overseas calls. The forced record follows the initial record for the call and is marked as no-charge. Information digit 3 is used to indicate the overwrite.

Record of TOPS verification

In offices equipped with feature package NTX030CD, an AMA record is created for each verification attempt made by a TOPS operator.

The verification record (standard NT TOPS F1 format) includes the calling and called numbers, the operator and team numbers, duration of the verification activity, and whether or not a barge-in occurred.

Each TOPS call can have several AMA entries associated with it, with the first entry always being an F1 or F3 record.

These verification records that follow the initial record on a file are listed in the same order they were created by the operator and are distinguished from the initial record in that they are never chargeable.

Premature billing

In offices equipped with feature package NTX181, the Operating Company is able to prematurely bill active billable calls before call processing is stopped for a controlled warm switch of CPU activity (SWACT).

Implementation is provided when parameter SWCT_AMA_PREBILLING of Table OFCENG is set to Y (yes) prior to a warm SWACT. This causes billable calls in progress at the time of the next warm SWACT to be billed, based on the duration of each call up to the time it was processed for premature billing.

Record of Prebilling

A marker entry is output to the AMA file before and after the production of the premature billing records.

These markers appear as RESTART CODES 2 and 3 in Restart Record FD. Code 2 indicates the start, and code 3 indicates the end of the premature billing process.

Note: 1 This feature is available in DMS-100, DMS-200 and DMS-100/200 switches only.

Note: 2 Only those calls with LAMA or CAMA recording may be billed prematurely; SMDR, IBN and TOPS data is not included.

Note: 3 Some of the calls prematurely billed may not survive the warm SWACT.

Note: 4 Separate identification of calls terminating normally during the prebilling period does not occur.

Note: 5 Prebilled calls that subsequently terminate normally do not create an AMA record for any time following the prebilled period.

AMA record of unanswered calls

Operating Company personnel may request the recording of unanswered calls. See Table OFCENG, Entry NO_ANS_CALLS_ONTAPE. The entry is triggered by the disconnect of the calling party. The recording and processing of unanswered call attempts permits testing of the AMA system on a periodic basis or coincident with initial installations and extensions. It also provides data for possible DDD network and supervision troubles, fraud detection, and special studies if required. Unanswered calls, when recorded, are identified by event information digit 2. For a description of start and elapsed times for unanswered calls, see Chapter 4.

AMA Record of specified unanswered calls

The Operating Company is able to specify whether unanswered calls should be recorded by type on an AMA file.

The existing office parameter NO_ANS_CALLS_ONTAPE (Table OFCENG) determines if all or none of the unanswered calls should be recorded; however, if set to NO, TOPS offices equipped with Table TOPSAMA may override the NO with a YES and request specific unanswered call types to be written to the AMA file. See *TOPS Customer Data Schema*, 297-2271-451.

Long duration call log reports

Log report AMA112 is generated by the system once each hour to list all calls which have been in progress for a time (specified by the Operating Company) that may range from one to 24 hours, as defined by parameter AMA_LONG_DUR_AUDIT_INTERVAL in Table OFCENG.

AMA system log reports

The log reports currently produced by the NT AMA system are as follows (see *Log Report Reference Manual*, 297-1001-840 for more information on log reports):

- **AMA 100:** This is logged for recording stream failures. The log is output whenever a process related to AMA changes status. The log indicates the status of acting billing functions and should never be suppressed or made unavailable.
- **AMA 112:** This is logged when a long duration call has been detected. The log gives the names of the two agents involved and the duration of the call. This log is produced for unanswered TOPS trunk-to-IT trunk calls, but will not be produced for unanswered line-to-trunk calls.

- **AMA 114:** This is logged when an outgoing AMA transfer occurs. The log gives counts of the number of records which have been written into the AMA file just closed. The count should be identical to that in the DIRP101 file rotation logs.

The CALL COUNT field has been added to AMA114 to provide information on call processing originated billing records on an AMA file. Refer to *Log Report Reference Manual*, 297-1001-840 for a complete description of this field.

- **AMAB100 through AMAB106:** These are logged only when the SPECIAL-AMA-REPORT option of Table OFCVAR is activated and provides a summary of the call information recorded, based on the record type as follows:
 - AMAB100 AMA_CALL_DATA
 - AMAB101 LAMA_CALL_DATA
 - AMAB102 TOPS_F_ENTRY
 - AMAB103 TOPS_EO_ENTRY
 - AMAB104 TOPS_E1_ENTRY
 - AMAB105 TOPS_E2_ENTRY
 - AMAB106 TOPS_E4_ENTRY
- **AMAB108:** This is logged whenever an AOSS handled call is recorded, providing a summary of the call information.
- **AMAB111:** This is logged for 800+ TOPS assisted domestic or overseas calls (record types B6 and B7).
- **AMAB118:** This is generated by the AOSS charge formatter when a recordable AOSS Voice Response (VR) call has ended.

Log reports related to AMA failures

The following are the log reports that are related to AMA failures:

- **DIRP101:** This is logged when files are rotated and when the AMA process fails due to software bugs or when recording-unit extension blocks are not available.
- **EXT108:** This is logged as an AMAFAIL ON indicating that the AMA subsystem is in trouble, or it is logged as AMAFAIL OFF indicating that the AMA subsystem has been restored to normal.

NT AMA call timing

All functions related to charging are carried out by call processing. The timing parameters used by the system are defined in Table OFCENG and consist of the following:

- **LONG_TIMED_RELEASE_DISC_TIME:** The time, expressed in 10ms units, that a called party on-hook is timed before releasing the connection to the calling party on a toll call.

The range, expressed in 10ms units, is 16 to 4080; default is 1600 (16sec).

Note: If this parameter is used to control the SUSpend timeout of ISDN User Part (ISUP) trunks, a value of 26 seconds or greater will not functionally propagate. The ISUP SUSpend timer is hard code limited to a maximum of 25.4 seconds. Datafilling LONG_TIMED_RELEASE_DISC_TIME with a value of 26 seconds or greater will result in a 25.4 second ISUP SUSpend message timeout.

- **MINIMUM_CHARGE_DURATION:** This defines the minimum time, expressed in 10ms units, that the called party must be off-hook in order for the call to be classed as answered. Where applicable, Operating Company regulatory requirements are to be followed.

The range, expressed in 10ms units, is 16 to 4080; default is 208 (2.08sec).

- **SHORT_TIMED_RELEASE_DISC_TIME:** This is the time, in 10ms units, that a called party on-hook is timed before releasing the connection to the calling party on a local call.

The range, expressed in 10ms units, is 16 to 4080; default is 208 (2.08sec).

Enhanced 800 service billing

Enhanced 800 (E800) service, available as part of feature package NTX554AA, is an Operating Company number service requiring access to the Operating Company databases. Operating Company number services provide inward call management features and require special numbers to be dialed. E800 service uses a special number service code (800) to indicate calls requiring special treatment. The special treatment required for E800 calls is a database query to obtain routing information as well as other call handling instructions.

E800 service is provided on a Service Switching Point (SSP) which will communicate with Operating Company databases using Signalling System 7 (SS7). A SSP is a node in the SS7 network which directs queries to a database located at a Service Control Point (SCP). A SSP may be an Originating Screening Office (OSO).

ACCS enhancements for Canadian application

Automated Calling Card Service, available in feature package NTX552A, allows the use of Common Channel Signalling 7 (CCS7) in querying a calling card and billed number database to determine validity of attempted calling card, third number billing, or collect calls. Operator intervention is not required to complete a call since the caller dials the calling card number for automatic validation.

Prior to ACCS, calling card numbers were validated by being entered into a network comprised of several Billing Validation Centers that were accessed through Common Channel Interoffice Signalling (CCIS). ACCS provides a Network Service Database System (SDB) for calling card number validation using CCS7.

OOC basic billing and rating

OOC Basic Billing and Rating, available in feature package NTX631A, provides a billing and rating system similar to TOPS for gateway operator services.

AOSS voice response extended call handling

Auxiliary Operator Services System with Voice Response (AOSSVR), available in feature package NTX720A, provides complete call handling capability for directory assistance and operator handled intercept calls. The Directory Assistance System Database services these calls by providing an external voice from an Audio Response Unit (ARU).

NT format to Bellcore format conversion

This information was originally published in *Automatic Message Accounting—Northern Telecom to Bellcore Format Conversion Guide*, 297-1001-340, which was cancelled for BCS35 to be incorporated in this publication.

Comparison of formats

Table 7-1 compares some of the recording characteristics of the NT and Bellcore AMA formats. The following paragraphs describe these characteristics in more detail.

Table 7-1 Recording characteristics—NT vs Bellcore formats		
Items	Bellcore	NT
Tape labels	IBN standard tape labels	IBM standard tape labels
Tape characteristics	9-track 1600 BPI NRZI ANZI	9-track 1600 BPI NRZI ANZI
Data encoding	packed signed decimal (BCD)	BCD or EBCDIC
Data recorded	record available Bellcore call types Answer and elapsed time to tenth of a second Record year, month, and date of the call Record WATS band for OUTWATS service Record WATS indicators for WATS service	record seven call types Answer and elapsed time to second Record day of year of the call Not available Not available

NT format

AMA data recording is made to either magnetic tape or disk. In the process of recording NT AMA data, the system captures all relevant call details, and at call completion maps the call information into the output format and stores it in the AMA buffer. The encoding technique used in assembling the call data is binary coded decimal (BCD). Extended binary code decimal interchange code (EBCDIC) encoding for the call data for the NT standard AMA format is optionally available.

The data sets on tape are preceded and succeeded by IBM Standard Tape Labels. A data set can contain one or more records, which are organized into blocks. The blocks within a data set are separated by interblock gaps.

The maximum block size supported by the DMS-100 file system is 2048 bytes. A record is not allowed to span blocks. If a record does not fit in the current block, the current block is written out on the tape and the record is inserted in the next block. Unused space in a block is padded with filler characters (hex "AA").

Record size is fixed per call type. A two-digit entry code assigned in the record is based on the charge class of the call type.

Bellcore AMA

For the most part, the tape characteristics of the Bellcore AMA format are identical to those in the NT format. The Bellcore AMA data is recorded into variable length blocks, which have a maximum length of 2048 bytes. In each of these blocks are variable length records, each containing information describing their own characteristics. Records are not allowed to span blocks and unlike the NT format, the unused space is not padded.

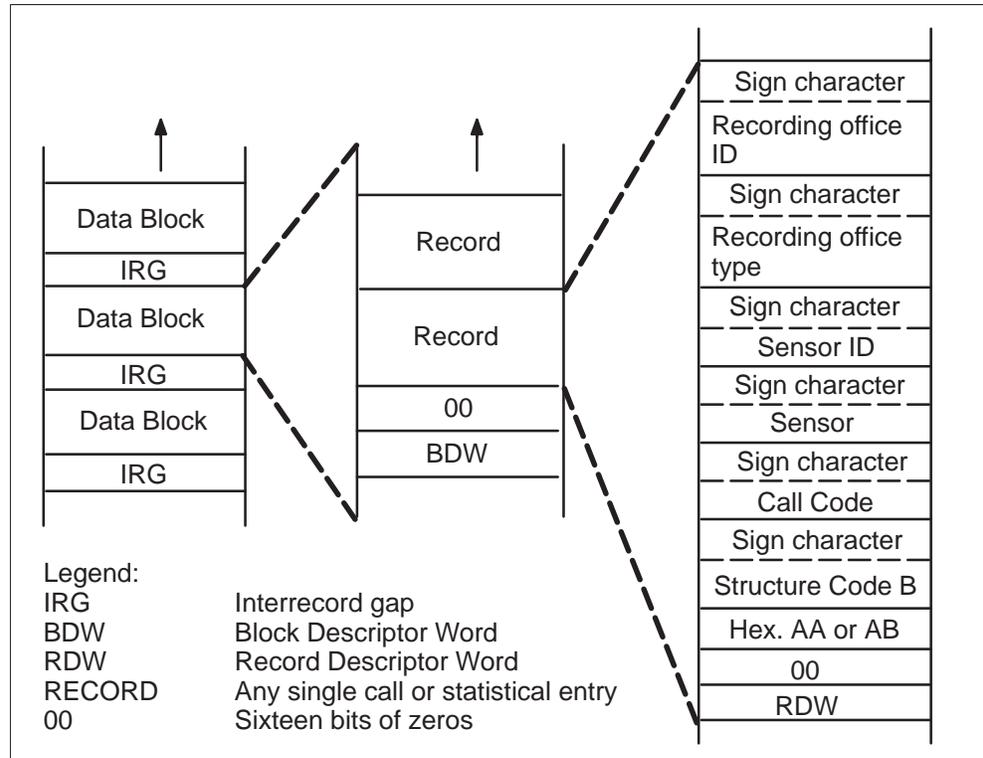
Data sets

Data sets, or data files, in the Bellcore AMA format consist of variable-length blocks of data, which contain the necessary AMA call records. Two file structures are used for Bellcore AMA data files. The structure used depends on whether or not AMATPS is used in the office.

AMA data file structure—offices without AMATPS

If AMATPS is not used, the AMA data files are structured as shown in Figure 7-1 .

Figure 7-1
Bellcore AMA data set structure



Both blocks and records within an AMA data file are preceded by a descriptor word that describes the characteristics of the block or record. For blocks, a block descriptor word (BDW) is used to describe the block. The BDW is four bytes long. The first two bytes describe the length of the block. The last two bytes are filled with zeros (0) to indicate that the records contained within the block are not spanned across data blocks.

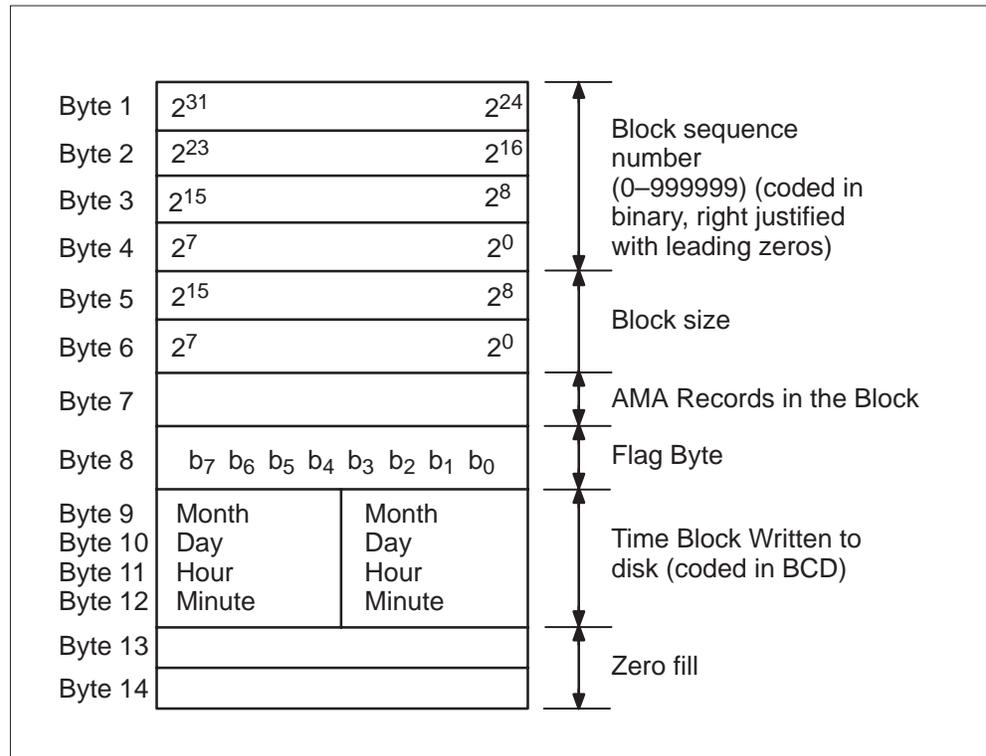
For records, a record descriptor word (RDW) is used to describe the characteristics of the record. The RDW is similar to the BDW. The RDW is four bytes long, with the first two bytes describing the length of the record and the last two bytes being filled with zeros (0) to indicate that the record is not spanned.

AMA data file structure—offices with AMATPS

If AMATPS is used in an office, information required for tracking and processing data blocks must be associated with each block of AMA data. Data files used in an AMATPS office contain a 20-byte header followed by one or more blocks of call records. Each call record block contains a 14-byte header, which provides information on the block itself and information required

to track and process the block as it passes through the transmission facilities to the RAO. The format of the block header is shown in Figure 7-2 .

Figure 7-2
Block header format—AMATPS office



The first four bytes of the block header contain a block sequence number to provide unique identification for the call records contained within the block. The sequence number is in binary, right-justified, with leading zeros. This identification is used for verification purposes and for requests for retransmission in cases where AMA data is found to have been lost during transmission or during a data copying operation.

The size of the block, which includes the block header and the records contained within the block, is provided in bytes five and six of the block header.

Byte eight contains a bit-oriented flag byte, which contains the information shown in Table 7-2.

Table 7-2 AMATPS office block header—flag byte (byte 8) contents		
Bit	Value	Meaning
0 (LSB)	1	transfer in
	0	otherwise
1	1	transfer out
	0	otherwise
2	1	primary tracer record
	0	not a primary tracer record
3	1	secondary block
	0	primary block
4	1	tracer record counts should be reset
	0	tracer record counts should not be reset
5	1	validation
	0	no validation
6	X	not used (don't care)
7 (MSB)	X	not used (don't care)

Bytes nine through 12 provide a time stamp to indicate when the data block was written to disk. The last two bytes, bytes 13 and 14, are filled with zeros (0) in DMS applications.

Call types and structure codes

In the Bellcore AMA format, all call types have one or more structure codes that define the structure of the record data. Each structure code defines a unique concatenation of data fields.

For details on the call types, structure codes, and data fields supported by the Bellcore format, refer to *Bellcore Format Automatic Message Accounting Reference Guide*, 297-1001-830.

Advantages of the Bellcore AMA format include the following:

- Due to its widespread adoption, the Bellcore AMA format is stable.
- Variable record length allows new records to be defined by combining existing data fields in different ways or by defining new data fields, and by assigning a new call code or structure code. A range of call codes (800–999) has been reserved for operating company assignments.

- Many revenue producing features, such as Multi-Unit Message Rate (MUMR), required by independent operating companies are available in Bellcore AMA format but not in NT AMA format. Using MUMR with bulk billing reduces the downstream processing time, which results in cost savings for the operating companies.

Converting from NT Format to Bellcore Format

This part contains information for converting NT standard AMA format to Bellcore format.

Preliminary

Conversion from the NT format to the Bellcore format requires the following actions:

- analysis of DMS-100 memory requirements based on the software load to be added
- insertion of the proper software in the DMS-100
- appropriate changes to downstream processing.

Conversion procedure

To convert output AMA records from the NT format to the Bellcore format, use the following procedure.

- 1 Ensure a current office image tape is available.
- 2 Ensure both CC have no hardware problems.
- 3 Match the stores of both CC by first entering the CC level of the MAPCI and then inputting the following command:

>MTCH

- 4 On the inactive CC, set the DACT switch to the DACT position (towards the right).

This action jams the inactive CC.

- 5 Drop synchronization by entering the following command:

>DPSYNC

This command causes a cold restart which takes approximately two minutes. At the conclusion of the cold restart, A1 is flashing on the inactive CC.

- 6 On the inactive CPU, set the ENAB switch UP. Set thumbwheel switch to 5, then operate RESET key.

This action causes a cold restart which takes approximately two minutes. At the conclusion of the cold restart, A1 is flashing on the inactive CC.

Note: For pre-BCS19: Once changing the FORMAT field in Table CRSFMT to BCFMT for tuple AMA and performing a restart reload, you will not be able

to change back to NT format by altering the FORMAT field to NTFMT and performing another restart reload. If the intentions are to go back to the NT format, the CC must remain out of sync, with the NT format on the inactive CC and a manual cold SWACT performed.

- 7 At a MAP terminal, access Table CRSFMT (*Customer Data Schema*, 297-1001-451) and change the value of the FORMAT field to BCFMT for tuple AMA by performing the following sequence in response to system prompts.
 - a. **>TABLE CRSFMT**
 - b. **>POS AMA**
 - c. **>CHA**
 - d. **>BCFMT** (in response to FORMAT prompt)
 - e. (change other fields if necessary)
 - f. **>Y**
 - g. **>QUIT**
- 8 In Table AMAOPTS (*Customer Data Schema*, 297-1001-451), set all periodic options with the default entries. Periodic options include the following entries:
 - AUDIT
 - LOGOPT
 - LONGCALL
 - OCCOVFL
 - OVERFLOW
 - TRACER

For example, in changing the entry for the LONGCALL option, perform the following sequence in response to the prompts:

 - a. **>TABLE AMAOPTS**
 - b. **>POS LONGCALL**
 - c. **>CHA**
 - d. **>DEFAULT**
 - e. **>Y**
 - f. **>QUIT**
- 9 In Table BCCODES (*Customer Data Schema*, 297-1001-451), input the desired call codes by performing the following sequence in response to system prompts:
 - a. **>TABLE BCCODES**
 - b. **>ADD call codes**

- c. **>Y**
- d. **>QUIT**
- 10 In Table OFCENG (*Office Parameters Reference Manual*, 297-1001-455), set the following office parameters:
 - NUM_OF_BC_AMA_UNITS
 - NUM_OF_BC_LAMA_UNITS
- 11 (For Equal Access offices only). In Table LINEATTR (*Customer Data Schema*, 297-1001-451) and Table TOPSBC (*TOPS Customer Data Schema*, 297-2271-451), set field CHGCLSS to NONE.
- 12 Do a restart reload on the active CPU, by entering the following command:
 - >RESTART RELOAD**
 - A restart reload takes approximately two minutes. A restart reload activates the Bellcore format AMA and also closes all active AMA files. New files should be opened for testing and rotated as needed. New disk files are opened automatically. Tape files must be opened manually.
- 13 On the inactive CC, set the ENAB switch UP. On the inactive CC, set the thumbwheel switch to 5, then operate RESET key.
 - This action causes a cold restart which takes approximately two minutes. At the conclusion of the cold restart, A1 is flashing on the inactive CC.
- 14 Copy the program stores by entering the PS level of the inactive CC and inputting the following command:
 - >COPY module**
 - For example, to copy module 0, input COPY 0.
- 15 Synchronize both CC by inputting the following command:
 - >SYNC**
- 16 On the inactive CC, set the DACT switch to the non-DACT position (towards the left). This action releases the jam from the inactive CC.
- 17 To verify on site the conversion to Bellcore format, make some test toll calls and receive AMAB117 output reports (assuming the LOGAMA option in Table AMAOPTS is activated). An example AMAB117 output report is following.

AMAB117 MAY05 09:26:25.5 6337 INFO AMA RECORD DATA
STRUCTURE CODE = 04700 CALL CODE = 006
CONNECT DATE = 80505 CONNECT TIME = 0926265
ELAPSED TIME = 00001326 ANSWERED = YES
CALLING DN = 6137224000
ORIG AGENT = CKT TOPCOMBMF 3
CALLED DN = 2122201111
TERM AGENT = CKT OGEACAR3 0

Verification can also be done using AMATEST and looking at the AMAB200 log reports.

After converting to Bellcore format, use the DIRPCOPY command for processing AMA records. For instructions on using the DIRPCOPY command, refer to *Device Independent Recording Procedures (DIRP) Routine Maintenance Procedures*, 297-1001-572.

DMS-100 Family

Automatic Message Accounting — Northern Telecom Format

Reference Guide

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