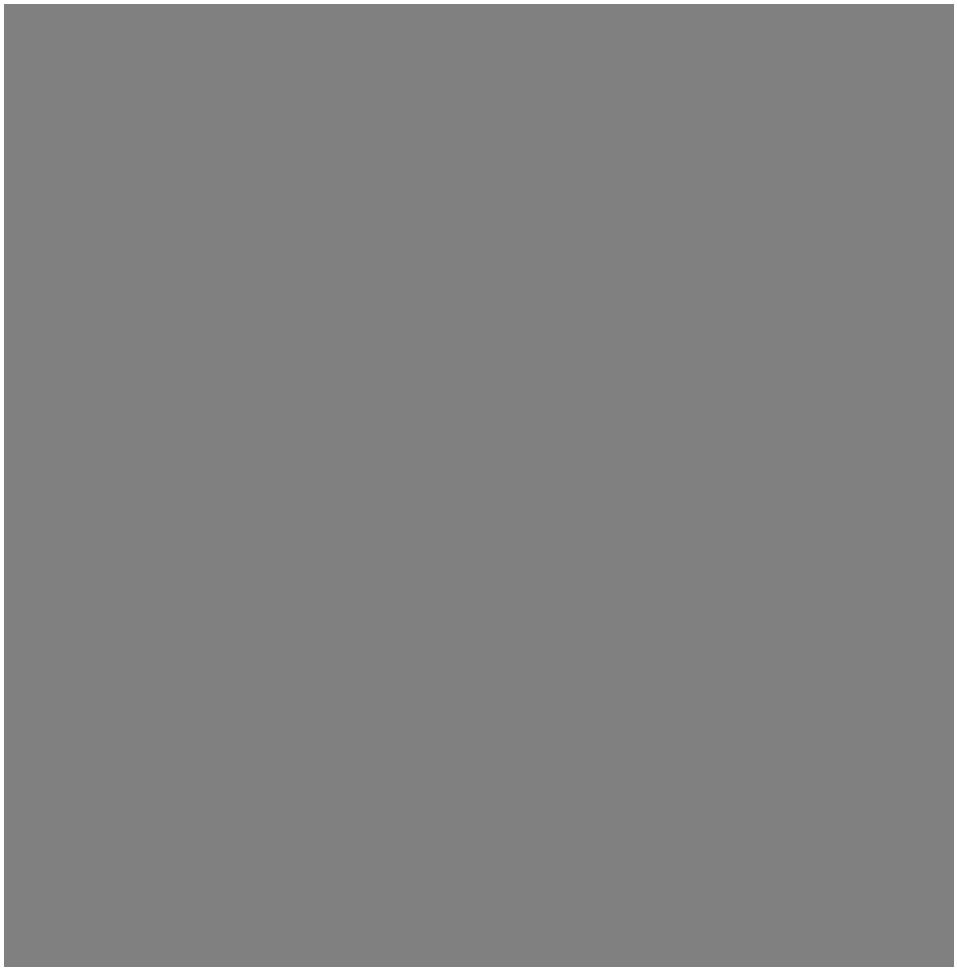
450-1021-181

Network Operations Systems

Business Network Management

SMDR Interface Specification NSR32 and up

DMSCCM04 Standard 32.01 August 1995



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Introduction

This Northern Telecom Practice (NTP) describes the interface between a Dynamic Network Control (DNC) System and customer premises equipment (CPE) that provides station message detail recording (SMDR) data to the customer (see Figure 11). The CPE for SMDR will typically be a personal computer or polling device capable of communicating with a DNC for the purpose of recording and processing SMDR data.

The DNC SMDR data is encoded in ASCII format. As a DNC option, a carriage return and line feed may be appended to each SMDR record to allow printing directly on a printer without any further manipulation.

This publication is compatible with Northern Interface Specification (NIS) No. Q202-1.

General description

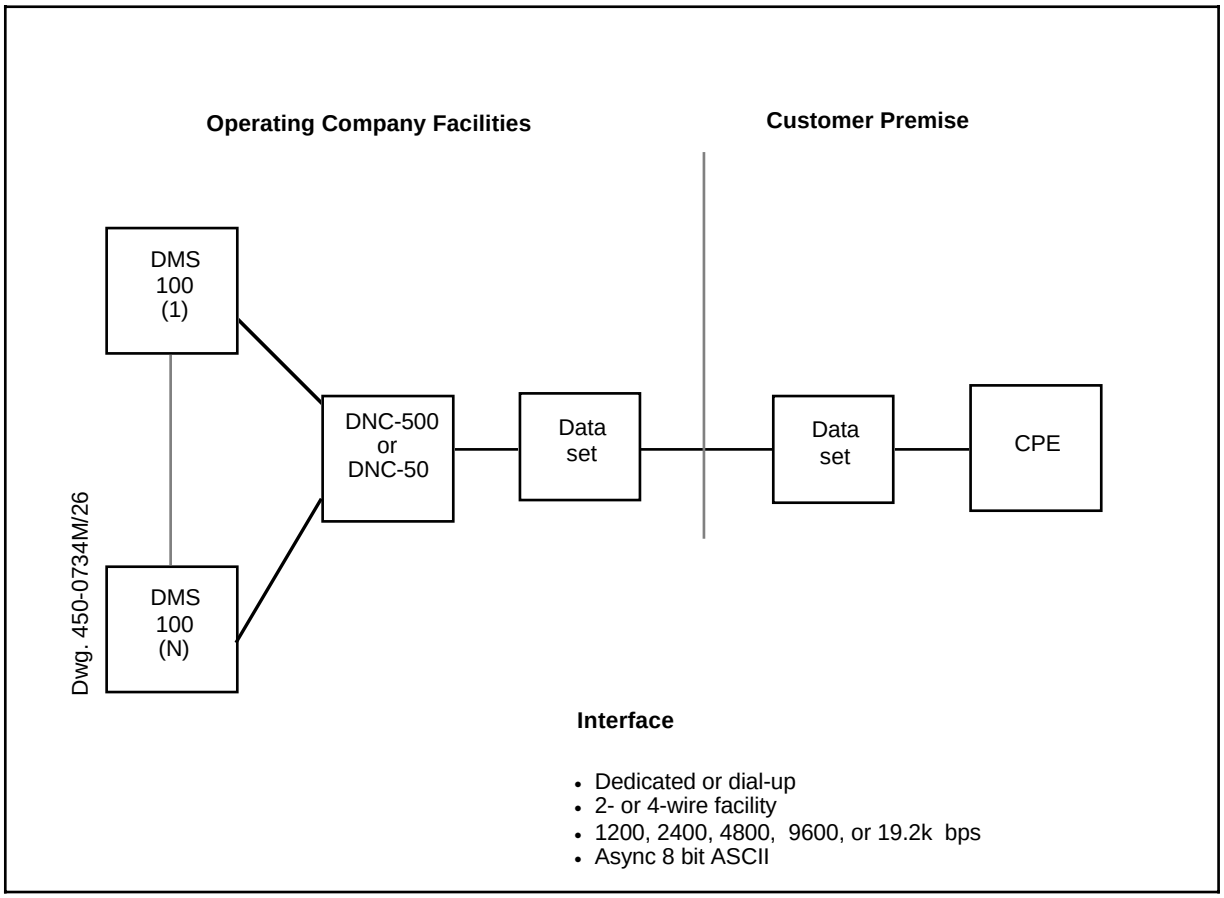
The SMDR data generated at the DMS node (a member of the DMS-100 family of digital switches) is collected and partitioned by customer at the DNC and periodically passed through an interface to an appropriate data modem which, in turn, interfaces a data link to the customer's premises. At the customer's premises, a complementary data modem extends the SMDR data to the CPE. This document assumes the use of a pair of modems compatible with each other and with the physical and electrical interfaces described herein, and is concerned mainly with the formats and content of the information on the data link.

There is no inherent method to ensure that the data transmitted will be received in a secure manner. If this is a priority requirement for a user, error correcting modems or DATAPATH † connections should be used.

† DATAPATH is a trademark of Northern Telecom.

Access to the DNC is via a dedicated or dial-up link. Once the feature is accessed in a dial-up mode, the customer identification and password are validated. The DNC data spooling feature transmits the SMDR data for a single node, or all the nodes, "owned" by the customer. Preceding the data, a beginning of transmission banner (header) will be output stating the customer name, DMS node name, data type (SMDR), customer group (if selected), and office ID associated with the data to follow. At the completion of the data transmitted from a particular location, an end of transmission banner (trailer) will be sent. Note that one or more headers may be output depending on the job type, but only one trailer will be output for either single or multi-node jobs.

Figure 1-1
Overall system block diagram



The flow control mechanism employed uses standard XON/XOFF protocol. The DNC will accept ASCII XON and XOFF characters to control data flow to the customer site. When an XOFF character is received by the DNC, execution of the task which accepted it is halted (PAUSE) until an XON character is received, at which time the transmission of data resumes. The transmission of an ESCAPE character to the DNC from the collecting device terminates the flow of data and prints an end of transmission banner. A new spool request is then required in order to receive more data.

The SMDR-to-customer-premises DNC products provide the ability to spool SMDR data as collected from the DMS nodes or the option of preprocessing of the data on the DNC prior to spooling to a downstream user. The preprocessing option provides replacement of specific data fields with a DNC reference. This reference is stable and removes the requirement for spooling and processing of the 'C2C2' cross-reference table.

The DNC reference is a name (or mnemonic) assigned by the system administrator and allows naming of the following entities on a per customer basis:

- trunk group ID
- virtual facilities group ID
- attendant console number
- customer group number

The SMDR preprocessing feature is optional and may be enabled or disabled by the system administrator on a per customer basis.

Change history

This section lists the important changes that affected this publication.

32.01

The following changes have been made to this document from feature SMDR Modification for International Direct Distance Dialing, specifically supporting the following requirements:

- upissued document from 28.32 to 32.01 to correspond to patch NSR32 activity (SMDR Modification for International Direct Distance Dialing)
- an increase in the number for international direct distance dialing (IDDD) from 12 to 15 digits, in accordance with International Telecommunications Union (ITU) requirements
- an increase in the length of the long SMDR record (D3) and the long network evaluation, reporting and verification (NERVE) call detail recording (CDR) SMDR record (D4)
- multiple DMS nodes with pre-NA004 and NA004 software releases or subsequent software releases to customer and customer premise equipment
- data spooling support, based on the Centrex customer requirement of receiving the former SMDR format (that is, 12 IDDD and 78 characters in the D3 and D4 call records) or the expanded international SMDR format (that is, 15 IDDD and 84 characters in the D3 and D4 records), regardless of the DMS operating software release. (By default, the end user customer receives the former SMDR format. BNM Customer Table must be datafilled to activate the expanded international SMDR format.)

NSR28

New Extension Records. The following new extension records for records D1 and D3 have been added to the SMDR data formats:

ID	As of BCS	Description
DA	26	for calls involving ISUP IBN trunks
DB	28	Meridian Supernode Billing
DB	29	Meridian Supernode Billing (added fields)
DC	29	Meridian Supernode Billing, PIN/TCN SMDR extension record

New Origination Records. The following new origination types for records D1 and D3 have been added to the SMDR data formats:

ID	As of BCS	Description
7	26	feature group D on MSL-100 (SL-100 only)
8	27	replaces VFG information whenever actual line identification is available for a PBX

Switch/PBX Poller Records. For NSR28, BNM allows the use of a CC3 polling device to interface between BNM and the non-DMS type nodes, such as PBXs, in a customer network. The SPP software converts the CC3 output into DMS SMDR format. The records supported by SPP are described in Chapter 6 of this document.

System operation

Feature activation and deactivation

There are two principle modes of activation that can be spooled for a single DMS node or all of the DMS nodes belonging to a customer:

- scheduled
- interactive

Scheduled mode

The scheduled mode assumes that the modem link is dedicated to the remote customer at all times. The data spooler is invoked via the DNC scheduler subsystem for a given time period (that is configurable). For example, the DNC timetable could be data filled to wake up every hour and capture the data for 10 minute time period. The data spooler task would be invoked at this frequency, initialize its worker task and send all the SMDR data that has not been previously sent for the specific customer on a per-node basis. After all the data that was available is sent by the data spooler, this task would revert to an idle state.

It is necessary to have one asynchronous RS-232C port dedicated to support a customer in this mode. This relationship is not necessary in the interactive mode.

Interactive mode

The interactive mode assumes that the modem link (DNC spooling port) is accessed via a dial-up line. In this mode the data spooler task continuously monitors all ports for seizure. To access this port, the end user dials the directory number assigned to the targeted spooling port. When the assigned line is seized, the DNC answers by establishing a data link connection. Once the data link connection is made, the DNC will wait for a response from the remote site. This response will contain the customer identification, password and data type, node (DMS node location) and customer group. These parameters are compared with the customer"s profile for validity.

If the parameters are NOT valid, the DNC will generate an appropriate message.

If the parameters are valid, the data having a transmit status of unsent or sending will be transmitted to the remote user. After the data has been sent the DNC will terminate the session. After each DNC data file partition is sent to the remote site, the data file is flagged in the DNC as being sent.

Operational control is performed by the remote user using the same link that the SMDR data is transmitted over.

There does not have to be a one-to-one relationship between a customer and RS-232C ports in this mode.

Files and spooling

SMDR data is stored on two files in the DNC: “X” files and “D” files. The X files contain the C2C2 data to support the non-preprocessed option. The D files contain the C1C1 data, along with the SMDR record information.

When the X and D files have not been spooled, they are marked as UNSENT. When these files have been transmitted successfully, they are marked as SENT.

If, during a spooling session, transmission of data is interrupted (such as during a link failure), the partially sent files retain their “unsent” status. When the problem is resolved, the next spooling session includes the data that was partially sent, as well as the remaining records that were not sent. After successful transmission of the data, the files are marked SENT.

In a case where data transmission has been interrupted and files partially sent, duplicate records may exist at the customer premise equipment after a successful re-transmission of the data. When this happens, provisions must be made to delete the partially sent files. This eliminates any duplicate records that may exist.

During an active spooling session when new SMDR records are being collected from the DMS node, the new records are marked as UNSENT and stored until:

- the next scheduled or interactive spooling session for a single spool pass
- they are spooled in subsequent passes during continuous spooling

The SMDR records are stored on the DNC for the period of days as determined by the operating company. When this period is exceeded, an administrative program removes the appropriate SMDR files. The current day’s collection utilizes the disk space that is vacated.

Stop session and disconnect

An end user terminates a spool session by pressing the ESC key.

(a) If a Hayes-compatible modem is used on the DNC side of the link, the data connection is dropped as soon as the trailer has been sent.

(b) If a standard modem is used on the DNC side of the link, the link remains up until it is manually disconnected (e.g., by pressing the “voice” button on the modem).

After the DNC has transmitted all requested SMDR data during a session, an END OF TRANSMISSION trailer is sent, after which the system sends the characters + + +. This concludes the session and the link automatically disconnects (when Hayes-compatible modems are used).

Man-machine interface (MMI)

The customer spooling feature is accessed by either the operating company scheduling a spool request using DNC scheduling services or by entering spool parameters from the customer/user premises (end customer). The spool parameters for end customers must include a customer ID and a password.

Jobs scheduled for an end customer should be performed from the scheduling services by the operating company. The operating company must log into the DNC as the customer (using the customer ID and password) to schedule these jobs.

Input parameters are:

- customer name
- password
- location
- customer group
- data type

Processing

A header is produced for each SMDR switch location. The header will contain the customer name, switch location, data type, and customer group.

Data received from each node is sent in 2K byte blocks and stored in customer-partitioned files on the DNC. The following is performaed for each block read:

- When DNC customer spooling is requested, each file ontains only those call records for the given customer group. Any non-call records are included as well.
- If masking is requested, each call record is processed and the originating directory number is matched against the DNC mask table. If the number is found in the mask table, then the corresponding terminating directory number in that record is masked.
- Some of the data received from the DMS node is encoded in binary coded decimal (BCD), and some is encoded in extended BCD (EBCDIC). The DNC converts these two codes into ASCII format for spooling to the CPE.
- If preprocessing is enabled, the internal DMS node identifiers are mapped to CLLI * codes. The mapping function takes the DMS identifier from SMDR call records and maps the identifier to a CLLI code which is contained in the SMDR data group translator records. The CLLI code is then mapped to a user-identified DNC reference which is contained in the DNC facility ownership tables. The DNC reference replaces the DMS identifier in the SMDR data stream prior to spooling of the data.
- If carriage control characters insertion is requested, then carriage return and line feed characters are inserted after each record in the current block.
- Data spooling support, based on the Centrex customer requirement of receiving the former SMDR format (that is, 12 IDDD and 78 characters in the D3 and D4 call records) or the expanded international SMDR format (that is, 15 IDDD and 84 characters in the D3 and D4 records), regardless of the DMS operating software release. (By default, the end user customer receives the former SMDR format. BNM Customer Table must be datafilled to activate the expanded international SMDR format.)

Interactive mode login command structure

The login command structure is simplistic in nature. The command is passed from the remote user to the DNC. This is the only input accepted by the DNC except for the following characters:

- XOFF- stop sending data (PAUSE)
- XON- continue sending data (RESUME)
- ESCAPE - terminate sending of data, session cancelled

To activate the interactive mode login, a wakeup sequence, transmitted from the remote site, is required in order to initiate the login procedure. At the start of the login procedure, a message will be transmitted to the remote user which will ask the remote site for the choice of login command inputs (prompt or no prompt)

* CLLI is a trademark of Bell Communications Research Inc.

and once a valid choice has been made and entered, the remote user can complete the login procedure to the DNC. This message will be displayed before each login attempt, provided the wakeup sequence is entered. In both cases, the input accepted by the DNC is echoed back to the remote site (except for password in prompt mode, see example). Also in both cases, an error message will be displayed if any parameter is incorrect after all input accepted by the DNC has been entered (see example). The wakeup sequence is:

.<carriage return> (CR)

Prompt login command

In this command mode, the user is prompted for customer name, password, location, customer group, and data type on separate lines. The location field determines whether the job is for multi-node or a single node. The password will be the only parameter that will not be echoed by the DNC. Successful sample sessions follows:

(a) single node job

.<CR>

Prompt	Input
CUSTOMER	> Customer1
PASSWORD	> (not echoed)
LOCATION	> Node1
CUST GRP	> <CR>
DATATYPE	> SMDR

transmission follows

(b) multi-node job

.<CR>

Prompt	Input
CUSTOMER	> Customer1
PASSWORD	> (not echoed)
LOCATION	> <CR>
CUST GRP	> <CR>
DATATYPE	> SMDR

transmission follows

An unsuccessful sample session follows:

.<CR>
Prompt or Noprompt command mode?(P, N (P default)) >P

Prompt	Input
CUSTOMER	> Customer1
PASSWORD	> (not echoed)
LOCATION	> Node1 (or <CR> for multi-node)
CUST GRP	> <CR>
DATATYPE	> XYZ
LOGON IS INVALID	

If an incorrect response is sent (e.g., for customer or location), the “logon is invalid” response appears only after all other parameters have been entered. To re-enter the parameters, the user must first reenter the wakeup sequence (.<CR>) and then complete the entire logon sequence. This process can be repeated until the logon sequence is successful.

Noprompt login command

In this command mode, the user inputs all data for the login sequence except for the defining the noprompt (N) command mode. All input is echoed by the DNC. The command sequence is as follows:

(a) single node job:

.<CR>

Prompt or Noprompt command mode? (P, N (P default)) >N
>//CUSTID/PASSWORD/DATATYPE SMDR N <location>//

(b) multi-node job:

.<CR>

Prompt or Noprompt command mode? (P, N (P default)) >N
>//CUSTID/PASSWORD/DATATYPE SMDR N <bl>//

An explanation of the format is as follows:

- // is a command delimiter
- / is a command separator
- CUSTID is a DNC reference for the customer (16 characters maximum)
- PASSWORD (8 characters maximum)
- DATATYPE is SMDR
- N is a DMS node location (16 characters maximum)
- bl is a blank character

Note:

- The maximum length of this string is 80 characters. If the string is greater than this, then the 81st character and beyond are ignored.
- There can be many parameters associated with a single data type.
- Parameters are separated by spaces.

Successful sample sessions as a result of successful login procedures are shown below for single node and multi-node jobs:

(a) single node job:

.<CR>

Prompt or Noprompt command mode?
(P, N (P default)) >N
>//CUST1/HELLO/DATATYPE SMDR N Node1//<CR>

transmission follows (see Sample Output Listing)

(b) multi-node job:

.<CR>

Prompt or Noprompt command mode?
(P, N (P default)) >N
>//CUST1/HELLO/DATATYPE SMDR N <bl>//<CR>

transmission follows (see Sample Output Listing)

An unsuccessful sample session for a single node job is shown below:

.<CR>

Prompt or Noprompt command mode?
(P, N (P default)) >N
>//CUST1/HI/DATATYPE SMDR N Node1 //<CR>
LOGON IS INVALID

Note: If the above unsuccessful sample session was for a multi-node job, a bl character would replace Node1.

Customer Data Spooling Parameters:

Cust. name	The identifier of the customer who owns the data. The customer name must be explicitly specified (up to 16 characters).
Password	This parameter corresponds to the password defined for the above customer name.
Location	The identifier of the DMS node where the requested data originated (up to 16 characters).
Cust. Group	This parameter is not used in NSR26.
Data type	The specific feature data type (SMDR) of the requested data.

Administrative Options:

OPTION	PER DNC	PER CUST
Spooling format		**X**
• preprocessed		
• non-preprocessed		
Spooling speed		**X**
• 1200, 2400, 4800, 9600 or 19.2k bps		
Activation modes		**X**
• scheduled		
• interactive		
Interactive login command		**X**
• prompt		
• noprompt		
Masking	**X**	
Carriage control	**X**	
Continuous spooling	**X**	
Multi-node spooling		**X**

Interface requirement

Physical

The physical requirement is a two-wire or four-wire link, dedicated or dial-up facility that can be effectively operated at 1200, 2400, 4800, 9600, or 19.2K bits per second when supported by a pair of compatible asynchronous data modems. The modem on the DNC side must be of the variety that does not drop the remote link when it receives "DTR LOW" from the DNC LAN interface unit (LIU). Access is through serial RS-232C ports.

Code format

The SMDR data is output in 8 bit (no parity) American standard code for information interchange (ASCII). Standard XON/XOFF characters control data flow.

General record types

SMDR files consist of one or more blocks of data. Each block is made up of a header record, that describes the block and its contents, and one or more data or call records. Blocks are delivered with two types of data, each with a unique header as follows, see notes:

HEADER ID	BLOCK CONTENT
C1C1	SMDR call records D1, D2, D3 and D4
	SMDR extension call records D5, D6, D7, DA, DB, and DC
	file rotation records FA, FB and FC
	restart record FD
	clock change record FE
C2C2	data group translator record
	data group terminator record E

Note 1: Records FA, FB, FC, FD and FE are described following the description of the Block Header Record -C1C1.

Note 2: The data group records are described following the description of the data group block header record C2C2. C2C2 records are not spooled in the preprocessed mode.

Note 3: All records contain ASCII characters only.

Note 4: Records D1, D2, D3, D4, D5, D6, DA, DB, and DC are described in Chapter 4.

Bblock header record (C1C1)

The C1C1 block header record is the first record of every block when the spooled data is preprocessed. Filler and spare field bytes are set to the ASCII spare character (X'20') unless otherwise noted. Figure 5-4 shows a sample of the preprocessed output listing and represents one block of data that has been transferred to the customer premise equipment.

Record Code 'C1C1'	Day	Hour	Block Number	Office ID
(4)	(3)	(2)	(5)	(6)

Following is a description of the record contents:

Record code	Identifies the record as 'C1C1'.
Day	Day in the year, value = 001 - 366.
Hour	Hour of entry, value = 00 - 23.
Block number	A sequential block count incremented by 1 each time a 2K block is written on the SMDR file on DIRP. Each block can be composed of many different customer group data records The range of this field is 00000 through 65535. 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 at the node.
Office ID	The standard office identification number assigned by the operating company.

File rotation records (FA, FB, FC)

A rotation record is made whenever a file rotation occurs at the DMS node.

Record Code	Filler Digit	Rotation Time				Record FB only All ASCII zeros
		Day	Hour	Min	Sec	
(2)	(1)	(3)	(2)	(2)	(2)	(28)

Following is a description of the record contents:

Record code	A two digit code defining the records as follows: FA = incoming non-emergency FB* = outgoing non-emergency FC = incoming emergency * Additional information may be appended to the FB record.
Filler	A filler character is represented as an ASCII zero (x'30').
Rotation file	Defines the time of day of the file rotation, as follows: Day: 001 - 366 Hour: 00 - 23 Minute: 00 - 59 Second: 00 - 59

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

Non-emergency transfer

An outgoing transfer entry is made into the buffer prior to the buffer being written onto the still active file just before transfer. An incoming transfer entry is made as the first entry of the next buffer load. When the buffer is full it will be written onto the newly active file.

Emergency transfer

When an emergency transfer occurs the full buffer is first written onto the first block of the newly active file while the incoming emergency transfer entry information is entered as the last entry of the first block. In the event that the first block is full, the transfer entry information becomes the first entry of the second block.

Restart record (FD)

If a warm or cold restart occurs in the DMS node, a restart entry is made identifying the type of restart and time of occurrence.

Record Code FD	Restart Type	Restart Time			
		Day	Hour	Min	Sec
(2)	(1)	(3)	(2)	(2)	(2)

Following is a description of the record contents:

Record code	A two digit code defining the restart record. Value = FD
Restart type	Defines the restart, as follows: 0 = warm restart 1 = cold restart
Restart time	Defines the time of day of 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:

(a) ***Cold Restart.*** A cold restart occurs when system sanity is lost and all calls which are in progress at the time of a cold restart, are terminated. SMDR information associated with these calls is lost.

(b) ***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. No SMDR data is lost.

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 record is therefore adjusted as follows:

DISC: Restart across DISC message (calling or called):

(a) Answer previously received:

Info. digit 1 answered	=	Y
Info. digit 2 CLD DISC	=	N
Elapsed time	=	0
Start time	=	time that answer was received

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

(b) No answer previously received:

Info. digit 1 answered	=	N
Info. digit 2 CLD DISC	=	N
Start time	=	time that trunk was seized
Elapsed time	=	0

ANSWER: Restart across ANSWER message:

(a) Answer previously detected:

Info. digit 1 answered	=	N
Info. digit 2 CLD DISC	=	Y or N
Start time	=	time that trunk was seized
Elapsed time	=	conversation time

(b) Answer not detected:

Info. digit 1 Answered	=	N
Info. digit 2 CLD DISC	=	Y or N
Start time	=	time that trunk was seized
Elapsed time	=	time since trunk was seized

Clock change entry record (FE)

A clock change entry is recorded on the active file in the event of a change to the DMS node's system time. Changes to system time can occur automatically or can be initiated manually by operating company personnel.

Record Code	Old Time				New Time			
'FE'	Day	Hour	Min	Sec	Day	Hour	Min	Sec
(2)	(3)	(2)	(2)	(2)	(3)	(2)	(2)	(2)

Following is a description of the record content:

Record Code	A two digit code defining 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

Identifier translator tables (not output in preprocessed mode)

In order to convert the numeric identifiers to external identifiers, for example the CLLI, a data table is provided when a new file is prepared. The data is formatted using the Data Group Block Header Record C2C2.

On opening a file, data tables can 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.

Data group block header record (C2C2)

The C2C2 header, precedes one or more data group records when spooled data is not preprocessed. Filler and spare field bytes are set to the ASCII space character (X'20') unless otherwise noted. Figure 4-3 provides a sample of the non-preprocessed output listing and represents one block of data that has been transmitted to the customer premises equipment (CPE).

Record Code 'C2C2'	Day	Hour	Block Number	Office ID	Format	Length
(4)	(3)	(2)	(5)	(6)	(1)	(3)

Following is a definition of the record contents:

Record Code	Identifies the record as 'C2C2'.
Day	Day in the year, value = 001 - 366.
Hour	Hour of entry, value = 00 - 23.
Block Number	A sequential block count which is incremented by 1 each time a block is written on the SMDR file. Value = 00000 - 65535.
Office ID	The standard office identification number assigned by the operating company.
Format	Denotes the format used, currently '0' for ASCII.
Length	Denotes the logical length of the record. Value = 009 - 130 (space characters used for padding the records to specified length).

Data group translator record (A, C, K, V)

A data record indicating the conversion of numerical identifiers to external identifiers, one or more of these records are preceded by a C2C2 header record.

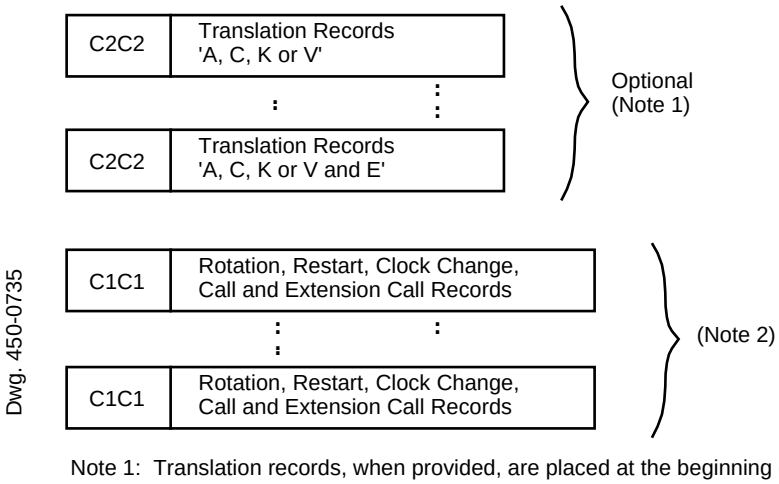
SP	DSN	SP	Record ID	SP	Group ID	SP	Symbolic Name
(1)	(5)	(1)	(1)	(1)	(4)	(1)	(16)

Following is a description of the records contents:

SP	Denotes ASCII spare character (X'20').
DSN	Denotes the Decimal Sequence Number, a sequential counter cycling from 0 - 32767.
Record ID	Defines the type of Identifier Translation Record. Identifies translation records, (CLLI Translator Records), translate the digits recorded in the call data to symbolic names for the trunk groups, customer groups, attendant consoles and virtual facility groups, as follows: A - Attendant Console name C - Customer Group name K - Trunk Group CLLI V - Virtual Facility Group name
Group ID	Identifies the internal number assigned to the group being translated to CLLI characters, as defined by the Record ID. Value can vary as follows: A - 0000 - 0225 C - 0000 - 4094 K - 0000 - 2047 V - 0000 - 8191
Symbolic Name	This symbolic name of the group defined by the Record ID, can be up to 16 characters in length, left justified and padded with ASCII spaces as required.

Note: These records are not necessarily dumped in sequential order of the Group ID.

Figure 3-1
File structures - SMDR



Note 1: Translation records, when provided, are placed at the beginning of each file when the file is prepared for service. These records are a fixed length of 30 bytes each.

Note 2: These records are of variable length as implied by the code in the first byte of each record.

Data group termination record (E)

This record denotes the end of a data table.

SP	RSN	SP	Record ID	SP	Padding
(1)	(5)	(1)	(1)	(1)	(21)

Following is a description of the record contents:

SP	Denotes one or more ASCII space characters.
RSN	Denotes the Record Sequence Number, a sequential counter cycling from 0 - 32767.
Record ID	Defines the type of record, value is 'E'.
Padding	Padded with ASCII space characters (X'20') so as to conform in length to that specified for the block in the associated C2C2 block header record.

SMDR file structure

A typical SMDR file is shown in Figure 3-1.

Non-preprocessed SMDR call records

Each call identified as an SMDR call in the DMS node generates an SMDR call record. An SMDR record can be in short or long format, depending on whether more than 12 digits were dialed. The record code identifies the record by short or long format, and also indicates whether the record is an SMDR record or a network evaluation, recording and verification (NERVE) record. Additionally, optional extension records can be provided which contain a record of the digits as outpulsed, and the authorization code and/or account code associated with the main call record. The call records are preceded by a C1C1 block header.

Call record formats (D1, D2, D3, D4)

Each call record is in ASCII format, except where noted. Any gaps in the records are filled with the ASCII character A (hexidecimal 41 (X'41')). The record format is illustrated in Figure 4-1 and contains the following information:

(a) ***Record Code:*** A two character code that identifies the call record type as follows:

CODE	RECORD TYPE
D1	Short format SMDR record
D2	Short format NERVE CDR record
D3	Long format SMDR record
D4	Long format NERVE CDR record

(b) ***CUSTGRP Number:*** A 3 digit code, delivered as an ASCII character representation of a hexidecimal number, defining the CLLI of the customer group (see Note 1). This number is converted to a CLLI name by the CLLI translation record (see Note 2).

(c) ***ORIGTYPE:*** A single digit code defining the call origination type as follows:

CODE	ORIGINATION TYPE
0	Station
1	Station with Special Billing Number (SPB) option
2	Attendant Console
3	Trunk
4	DISA_DN
5	Virtual Facility Group (VFG)
6	Six Port Conference circuit originator
7	Feature group D on MSL-100
8	Automatic Number Identification (ANI) Information
A	Unknown

(d) ***ORIGID:*** Twelve ASCII digits denoting the ID of the originator. The formats, as shown in Figure 4-2 vary according to ORIGTYPE as follows:

ORIGTYPE	DIGITS	MEANING
0	1-10	Station Billing Directory Number (DN)
	11	Spare
	12	Data Call Identifier (see DCI code description)
1	1-10	Station Billing DN with SPB
	11	Spare
	12	Data Call Identifier
2	1-10	Customer subgroup Billing DN (Attendant originated calls)
	11-12	Attendant Console Number (see Notes 1 and 2) (Range = 0 to 255)
3	1-3	Trunk group ID, a 3 digit code to be converted to CLLI (Notes 1 and 2*)
	4	Spare
	5-8	Trunk member ID, a 4 digit code (see Note 1*)
	9-11	Spare
	12	Data Call Identifier

- continued -

* See notes following 4.02 (i).

ORIGTYPE (continued)

ORIGTYPE	DIGITS	MEANING
4	1-10	DISA DN
	11	Spare
	12	Data Call Identifier
5	1-3	VFG ID, a 3 digit code to be converted to VFG symbolic name (Notes 1 and 2*)
	4	Spare
	5-8	VFG member number, a 4 digit code (see Note 1*)
	9-11	Spare
	12	Data Call Identifier
6	1-12	Originator not determined by system. All spaces filled with ASCII A (X'41')
7	1-10	Automatic Number Identification
	11	Spare
	12	Data Call Identifier
8	1-10	With the VFG billing number provided and the AIOD enabled, this field contains the VFG Billing Number.
	1-10	With the VFG billing number not provided and the AIOD enabled (the general case), this field contains the Automatic Number Identification.
	1-10	With the VFG billing number not provided and the AIOD disabled, this field contains the PX trunk (billing) number.
	11	Spare
	12	Data Call Identifier

The Data Call Identifier field has the following meaning within the call records:

DCI Code	Data Call	Modem Pool	Description
0	N	N	Voice Call
2	Y	N	Data Call without MP
3	Y	Y	Data Call with MP
A	-	-	Unknown or Feature Inactive

(e) ***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:

DIGIT	EVENT	VALUE							
		0	**1**	**2**	**3**	**4**	**5**	**6**	**7**
1	Service Analysed:	N	Y	N	Y	N	Y	N	Y
	ANI Fail:	N	N	Y	Y	N	N	Y	Y
	Answered:	N	N	N	N	Y	Y	Y	Y
2	CLD Part Disc:	N	Y	N	Y				
	Attendant Extended:	N	N	Y	Y				

(f) ***Console Number:*** A 2 digit code valid only if Attendant Extended is indicated by information digit 2. Range = 0 to 255 (see Notes 1 and 2 *)

(g) ***SUBGROUP:*** Digit in the range 0 to 7

(h) ***TERMTYPE:*** A single digit code defining the call termination type as follows:

CODE	ORIGINATION TYPE
0	Station
2	Attendant Console
3	Trunk
4	DISA_DN
5	VFG
A	Unknown

* See notes following 4.02 (i).

(i) ***TERMID:*** Twelve ASCII digits denoting the ID of the Terminator. The formats, as shown in Figure 4-3 vary according to TERMTYPE as follows:

TERMTYPE	DIGITS	MEANING
0	1-10	Station Billing Directory Number (DN)
	11-12	Spare
2	1-10	Spare
	11-12	Attendant Console Number (see Notes 1 and 2) (Range = 0 to 255)
3	1-3	Trunk group ID, a 3 digit code to be converted to decimal which is used as the CLLI (see Notes 1 and 2*)
	4	Spare
	5-8	Trunk member ID, a 4 digit code (see Note 1)
	9-11	Spare
	12	Answer Type, as follows: 0 Electrical answer 1 Synthetic answer 2 A.T.D. voice frequency detected answer 3 A.T.D. default answer, reported when voice detection was used but voice is not detected
4	1-10	DISA DN
	11-12	Spare
5	1-3	Virtual facility group ID. A 3 digit code to be converted to VFG symbolic name (see Notes 1 and 2)
	4	Spare
	5-8	VFG member number, a 4 digit code (see Note 1)
	9-12	Spare - All spaces filled with ASCII A (X'41')

Note 1: These codes delivered as an ASCII character representation of a number in hexadecimal which equates, for example, to the Trunk Group ID in decimal.

EXAMPLE:		
ASCII	**HEX**	**TRUNK GROUP ID**
'4"E"8'	4E8 =>	1256

Note 2: The dump/restore process during DMS BCS insertion can alter the mapping of these numbers to their specific names. This occurs whenever Consoles, CLLI or Groups have been deleted from DMS tables. The dump/restore resequences the numbers to fill the holes left by the deleted entries.

Downstream processing can be immune to dump/restore changes by expressing consoles, CLLI, and group designations in character form, rather than numeric form, when output files are generated. This mapping can be performed through use of the appropriate C2C2 translation records.

(j) ***Route Information Digit:*** This digit, with a value of 0 through 7, provides information by means of a Yes/No system. The combination of Automatic Route Selection (ARS) and Expensive Route indicates that the expensive route was chosen by DMS and the user was not given Expensive Route Warning Tone (ERWT).

If the user is given ERWT and accepts it by remaining off-hook until the call completes, the expensive route flag is set and the ARS flag is turned off.

EVENT	VALUE							
	0	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Digits Missing:	N	Y	N	Y	N	Y	N	Y
ARS Selected Route:	N	N	Y	Y	N	N	Y	Y
Expensive Route:	N	N	N	N	Y	Y	Y	Y

(k) ***Start Time:*** The record in this field defines one of: Answer calls - the date and time that a valid answer signal was detected, or Unanswered calls - the date and time at which initial trunk seizure occurred. The 9 digit time record contains the following:

Day in year	001 - 366
Hour	00 - 23
Minute	00 - 59
Second	00 - 59

(l) ***Elapsed Time:*** The six digit field, right justified and padded with zeros where required, contains one of the following:

- Answered calls - total conversion time in seconds.
- Unanswered calls - the total time that the outgoing trunk or line was seized.

(m) ***Originating Feature Code:*** A single digit code defining the feature code of the originator as follows:

CODE	ORIGINATOR FEATURE
0	Default
2	3-way calling or call forwarding
3	6-port conference, attendant or meet-me (appears only when ORIGTYPE = 6)
4	Call park retrieval
6	Multiple answer
8	Preset conference
9	Group interconnection call

(n) ***Terminating Feature Code:*** A single digit code defining the feature code of the terminator as follows:

CODE	TERMINATOR FEATURE
0	Default
1	Call forwarding
3	6-port conference - Attendant or meet-me
5	Call-back queuing or ring-again
6	Multiple answer
7	Flexible station-controlled conference
8	Present conference

(o) ***Called Digits:*** A 12- or 24-digit code defining the called digits, the format is based on the record code as follows:

Note: For software releases NA004 and above with international calls, the number of called digits increases to a maximum of 30 digits.

CODE	FORMAT
D1, D2	Short format from 1 to 12 digits, left justified and padded with filler digits ASCII A (X'41') as required.
D3, D4	Long format from 13 to 24 digits, left justified and padded with filler digits ASCII A (X'41') as required. ***Note:*** For software releases NA004 and above with international calls, the length of the D3 and D4 codes expands up to 30 digits.

Extension record formats

Digits-as-outpulsed extension record (D5)

The D5, Digits-As-Outpulsed (DAO) extension record is produced, if RAO (Record digits-As-Outpulsed) is present in the DMS OPT field of table CUSTSMDR. This record is always associated with the most recent main call record and is always in the same block in the SMDR file. The record format is illustrated in Figure 4-1 and contains the following information:

(a) ***Record Code:*** A two character code that identifies the call record type as follows:

CODE	RECORD TYPE
D5	DAO Extension Call Record

(b) ***Digits Outpulsed:*** A code of up to 23 digits denoting the outpulsed number, digits are left justified and are padded with ASCII A (X'41'), if required.

Note: For software releases NA004 and above with international calls, the maximum number of digits outpulsed is expanded up to 29 digits.

(c) ***Digits missing:*** A single digit code indicating the following:

VALUE	MEANING
0	If all digits have been recorded.
1	If more than 23 digits have been outpulsed. ***Note:*** For software releases NA004 and above with international calls, the value of 1 appears if more than 29 digits have been outpulsed.

Account or authorization code extension record (D6)

The D6, Account or Authorization Code extension record is produced, if an account code or an authorization code is associated with the call. If both are present, then two extension records are produced. The record format is illustrated in Figure 4-1, and contains the following information:

(a) ***Record Code:*** A two character code that identifies the call record code as follows:

CODE	RECORD:
D6	Indicating that this is an account or authorization code record.

(b) ***Record Type:*** A single character code that identifies the record type as follows:

VALUE	RECORD TYPE
0	Account code
1	Authorization code
2	Combined account and authorization code

(c) ***Spare:*** A single digit field containing the ASCII A (X'41') character. This field is inserted to ensure that the extension record is filled on an even byte boundary.

(d) ***Digits:*** Up to 14 digits, defining the account or authorization code, left justified and padded with filler digits ASCII A (X'41') as required.

Networked SMDR extension record (DA)

The DA, networked SMDR extension record, is produced from calls involving ISDN user part (ISUP) IBN trunks. The record format is illustrated in Figure 4-1, and contains the following information:

(a) ***Record Code:*** A two character code that identifies the call record code as follows:

CODE	RECORD:
DA	Indicating that this is a networked SMDR extension record.

(b) ***Trunk Group ID:*** A three digit binary number, which can be converted to the CLLI of the ISUP IBN trunk group associated with this call record.

(c) ***Spare:*** A single digit field containing the ASCII A (X'41') character. This field is inserted to ensure that the extension record is filled on an even byte boundary.

(d) ***Trunk Member ID:*** A four digit binary number which represents the trunk member ID associated with this call record.

(e) ***Network CLID:*** A ten digit calling DN from the initial address message (IAM) associated with this call record.

Meridian supernode SMDR extension record (DB)

The DB, Meridian Supernode SMDR extension record, is produced from calls originating from a Meridian Supernode. This extension record has a different length in BCS29 due to the addition of the Billing Digits field (10 digits). See the description below for more details on this field. The record format is illustrated in Figure 4-1, and contains the following information:

(a) ***Record Code:*** A two character code that identifies the call record code as follows:

CODE	RECORD:
DB	Indicating that this is a Meridian Supernode SMDR extension record.

(b) ***MSN Originating Type:*** A single digit code that identifies the Meridian Supernode origination call type. The originating type code contains the following information:

VALUE	ORIGINATING TYPE
0	other
1	feature group A
2	feature group B
3	feature group C
4	feature group D
5	dedicated access trunk (DAT)

(c) ***MSN N00 Call Type:*** A single digit code that identifies the type of call that was in use. The call type format contains the following information:

VALUE	CALL TYPE
0	none
1	universal
2	INWATS
3	700
4	900

(d) ***Information Digits:*** A two digit code representing the ANI information digits.

DIGIT	EVENT	VALUE							
		0	1	2	3	4	5	6	7
1	Service Analysed:	N	Y	N	Y	N	Y	N	Y
	ANI Fail:	N	N	Y	Y	N	N	Y	Y
	Answered:	N	N	N	N	Y	Y	Y	Y
2	CLD Part Disc:	N	Y	N	Y				
	Attendant Extended:	N	N	Y	Y				

(e) ***ANI Number:*** A ten digit automatic number identification number. The field is left justified and padded with filler digits ASCII A (X'41') as required.

(f) ***ANI Suffix:*** A single digit code that represents the type of equal access call. The suffix format contains the following information:

VALUE	CALL TYPE
0	no ST digit
1	transitional EA - ST3P
2	cut through EA - STP
3	transitional EA - ST2P
4	pure EA - ST
5	invalid ST digit

(g) ***Carrier Access Code:*** Used with FGB, is a four digit number. For other groups the field is padded with filler digits ASCII A (X'41').

(h) ***Access Directory Number:*** A ten digit field representing the access directory number that was dialed. If the call was an INWATS call, then the 800 number is recorded. In all other cases, except universal access, the DISA DN from the BILLDN field in table TRKGRP is recorded in this field.

(i) ***MSN ANI Mapping:*** A single digit field, when containing a binary 1, indicates an incoming IBN FGD PTS trunk with ANI is supplying an outgoing IBN ISUP SS7 agent, or an outgoing IBN ISDN PRA agent, with calling line ID (CLID). This field when containing a binary 0, indicates that the foregoing condition was not met.

(j) ***Spare:*** A single digit field containing the ASCII A (X'41') character. This field is inserted to ensure that the extension record is filled on an even byte boundary.

(k) ***Origination Time:*** A nine digit field representing the date and time at which the initial trunk seizure occurred. The field consists of the following (left justified):

DIGIT	VALUE
1-3	001 - 366 representing the day
4, 5	00 - 23 representing the hour
6, 7	00 - 59 representing the minute
8, 9	00 - 59 representing the second

(l) ***Treatment:*** A single digit field, when containing a binary 1, indicates that the call was routed to treatment. When the field contains a binary 0, the call was not routed to treatment.

(m) ***Re-origination:*** A single digit field, when containing a binary 1, indicates that the call has been re-originated. When the field contains a binary 0, the call was not re-originated.

(n) ***Billing Digits:*** A ten digit field used to record calls involved with hotline dialing. This field was introduced with BCS29.

PIN/TCN SMDR extension record (DC)

The personal identification number (PIN)/ travel card number (TCN) SMDR extension record (DC), is produced from calls originating from a Meridian Supernode using: The record format is illustrated in Figure 4-1, and contains the following information:

- PIN digits, if the PIN option has been assigned to the associated customer group in the SMDR customer table CUSTSMDR.
- TCN digits, if the TCN option has been assigned to the associated customer group in the SMDR customer table CUSTSMDR.

The record format is illustrated in Figure 4-1, and contains the following information:

(a) ***Record Code:*** A two character code that identifies the call record code as follows:

CODE	RECORD:
DC	Indicating that this is a PIN/TCN SMDR extension record.

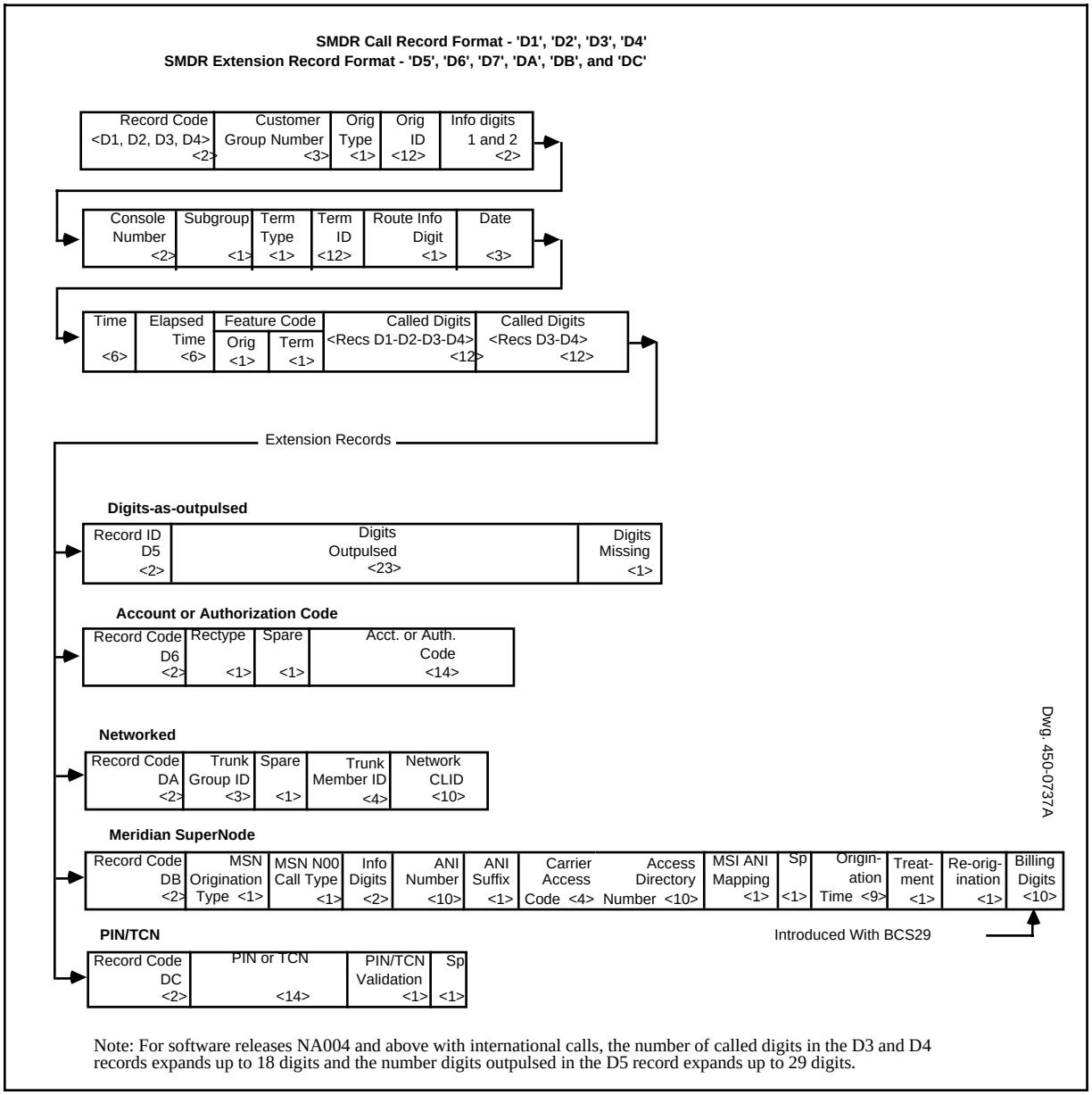
(b) ***PIN or TCN:*** A 14 digit field that contains either the PIN or TCN. A PIN can be two, three, or four digits. The digits are left justified and padded with filler digits ASCII A (X'41') as required.

(c) ***PIN/TCN Validation:*** A single digit field that is used to determine the type of data in the PIN or TCN field. The possible values for this field are:

VALUE	CALL TYPE
0	no PIN or TCN
1	valid PIN
2	invalid PIN
3	valid TCN
4	invalid TCN
5	TCN timeout

(d) ***Spare:*** A single digit field containing the ASCII A (X'41') character. This field is inserted to ensure that the extension record is filled on an even byte boundary.

Figure 4-1
Non-preprocessed SMDR call record format



Note: For software releases NA004 and above with international calls, the number of called digits in the D3 and D4 records expands up to 18 digits and the number digits outpulsed in the D5 record expands up to 29 digits.

Figure 4-2
Call originating type formats, non-preprocessed option

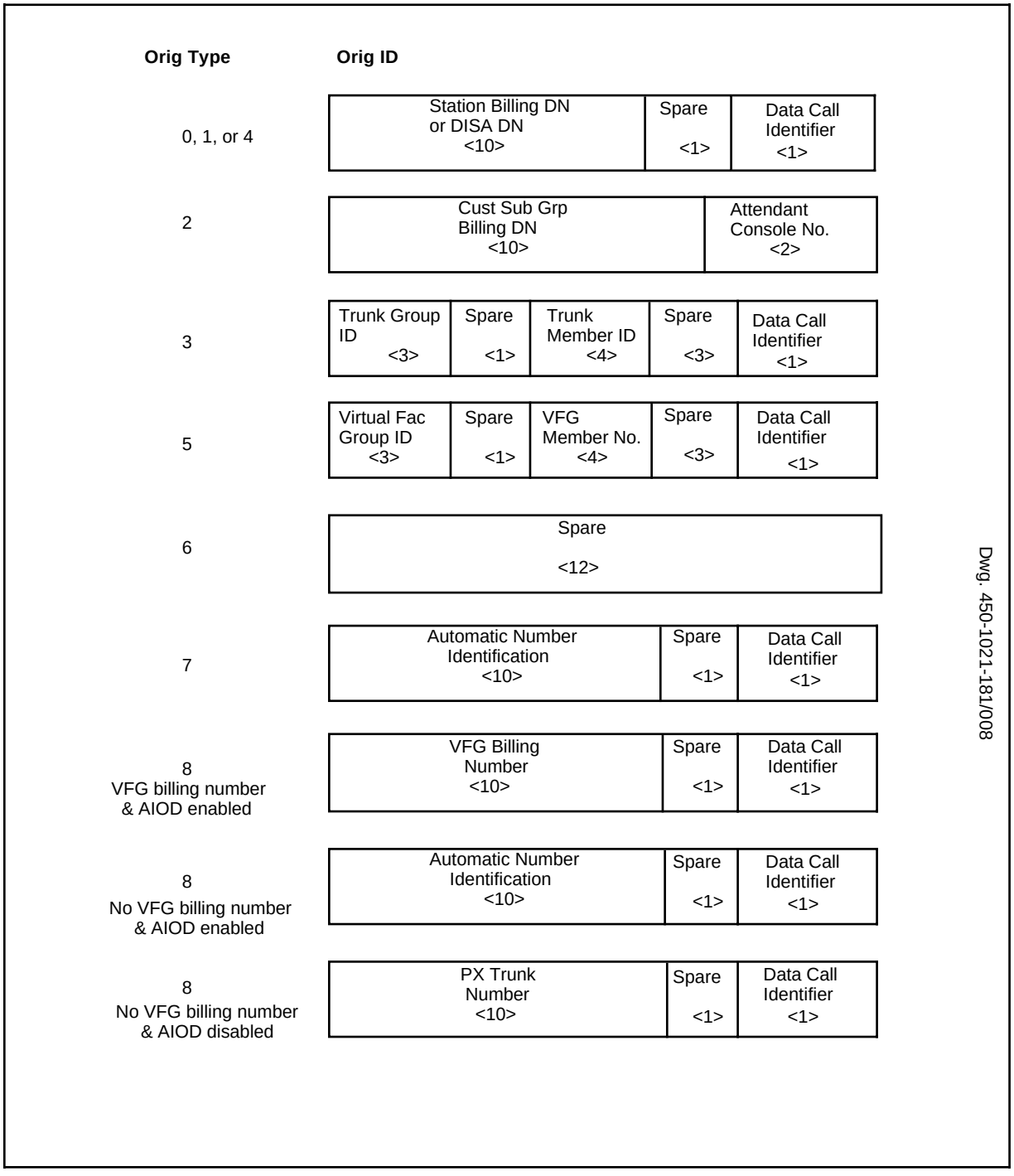
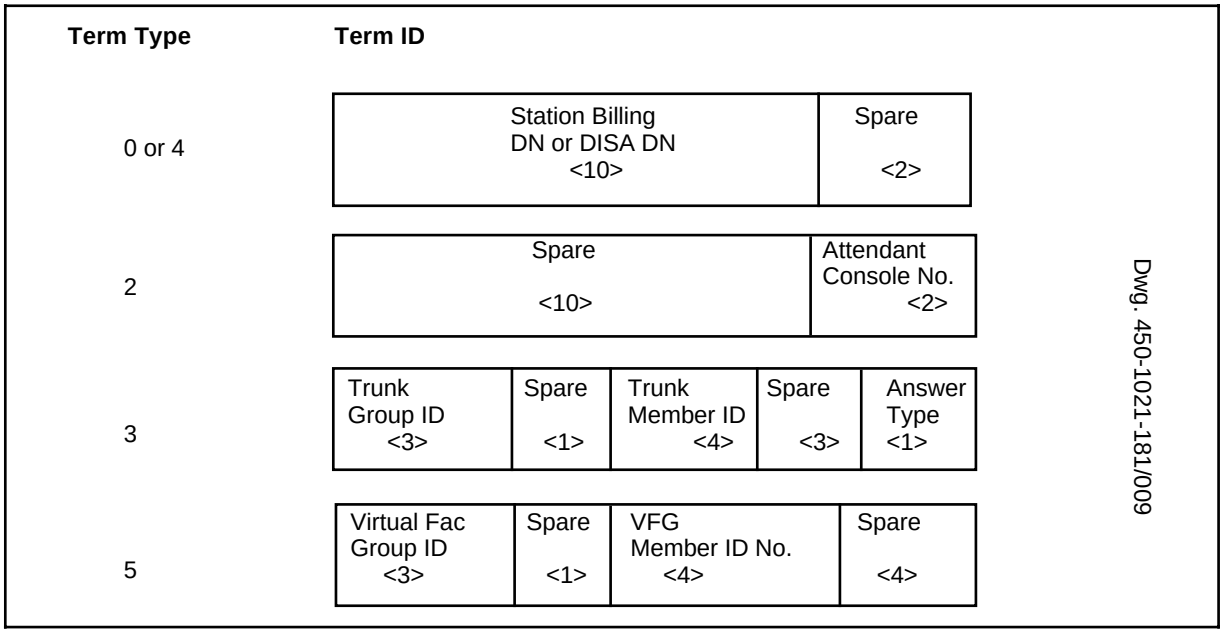


Figure 4-3
Call terminating type formats, non-preprocessed option



Explanation of non-preprocessed output data

Each record of Non-Preprocessed SMDR output data is formatted on a single line divided into blocks for each DMS node. A complete output data job consists of header identifiers, data, and an end of transmission identifier. The number of headers is dependent on the type of data transmitted. There are four types of output data, they are:

- Single Node, Single Pass
- Single Node, Multi-Pass
- Multi-Node, Single Pass
- Multi-Node, Multi-Pass

Single node single pass

Figure 4-4 is an example of the format for a single node single pass SMDR data transmission job.

Referring to Figure 4-4, the output starts with a header containing the customer ID, location, and the type of data. Asterisks are used in the left margin to bracket the header. Following the header are the C2C2 and C1C1 information areas.

As Figure 4-4 consists only of a small amount of information, an end of transmission identifier is included indicating that the transmission is complete. The end of transmission part, bracketed by asterisks on the left margin, contain the number of blocks transmitted.

The last line in a data transmission contains three plus signs to signify the end of transmission.

Realistic data output will vary from that shown in Figure 4-4 because of the type of collection and how many DMS nodes are producing data. Three examples of data collection jobs are shown in Figure 4-6, 4-7 and 4-8. Each figure contains a set of blocks representing the information contained in Figure 4-4.

Single node multi-pass

An example of the format of a single node, multi-pass SMDR data output job is shown in Figure 4-4. In this example, data is being collected from the DMS node identified as 0. The first block contains a header, C2C2, and C1C1 data parts. Subsequent blocks do not contain a header or C2C2 information as they had not changed. If the C2C2 part had changed, the first block after the change will contain the changed C2C2 information. This example consisted of a job that contained 4 blocks.

Multi-node single pass

An example of the format of a multi-node single pass SMDR data output job is shown in Figure 4-7. In this example, each block contains a header, C2C2 and C1C1 information. Also, only DMS nodes 0, 1, 2, and 5 had information for processing. The data transmission ends with the normal end of transmission identifier.

Multi-node multi-pass

The multi-node multi-pass output job, the most complex format, is shown in Figure 4-8. In this example only two passes are shown, in reality the number of passes will be dependant on the duration of the time interval for the job.

In this example the C2C2 information area is different for each node being spooled. However, the same C2C2 information may apply for spooling output generated in separate passes for the same node. In Figure 4-8 the second pass of the DMS node 1 does not have a C2C2 area (because it had not changed since the last pass). Also, in the first pass DMS node 2 was not polled (no information), but in the second pass DMS node 2 contained SMDR information.

Figure 4-4
Sample header and data block content, non-preprocessed option

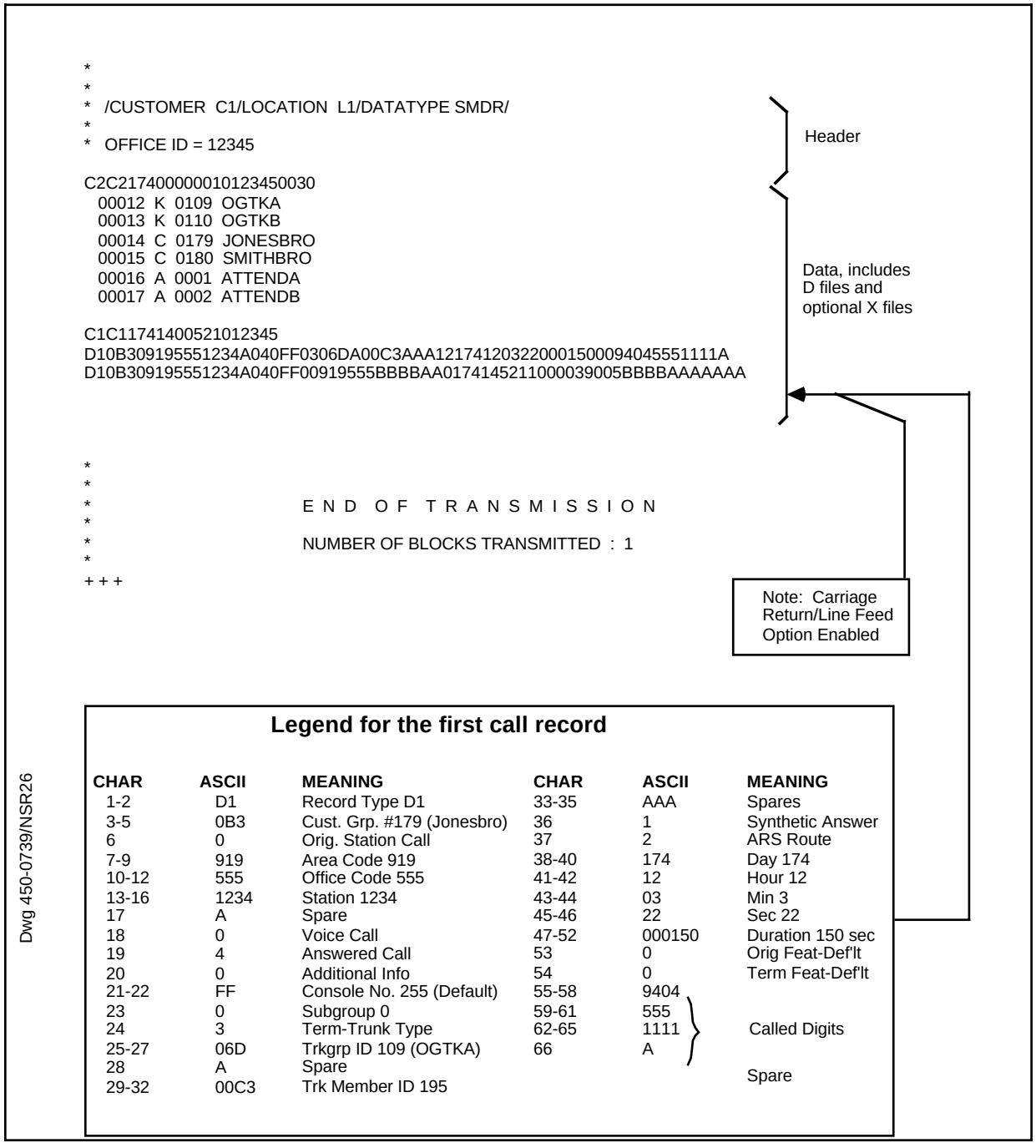


Figure 4-5
Non-preprocessed records, un-masked and masked characters

In the former SMDR format, the un-masked, non-preprocessed spooled D3, D4 and D5 records resemble the following:

D30B309195551234A040FF0306DA00C3AAA1217412032200015000
94045551111AAAAAAAAAAAAA
D40B309195551234A040FF0306DA00C3AAA1217412032200015000
94045551111AAAAAAAAAAAAA
D5918006698673AAAAAAAAAAA0

The expanded SMDR format for un-masked, non-preprocessed records is as follows:

D30B309195551234A040FF0306DA00C3AAA1217412032200015000
94045551111AAAAAAAAAAAAA**AAAAAA**
D40B309195551234A040FF0306DA00C3AAA1217412032200015000
94045551111AAAAAAAAAAAAA**AAAAAA**
D5918006698673AAAAAAAAAAA**AAAAAA**0

In the former SMDR format, the masked, non-preprocessed spooled D3, D4 and D5 records for Centrex calls resemble the following:

D30B309195551234A040FF00919555BBBBAA0174141452100003900
5BBBBAAAAAAAAAAAAAAAAAAAA
D40B309195551234A040FF00919555BBBBAA0174141452100003900
5BBBBAAAAAAAAAAAAAAAAAAAA
D5918006698673AAAAAAAAAA0

The expanded SMDR format for masked, non-preprocessed records is as follows:

D30B309195551234A040FF00919555BBBBAA0174141452100003900
5BBBBAAAAAAAAAAAAAAAAAAAA**AAAAAA**
D40B309195551234A040FF00919555BBBBAA0174141452100003900
5BBBBAAAAAAAAAAAAAAAAAAAA**AAAAAA**
D5918006698673AAAAAAAAAAA**AAAAAA**0

Figure 4-6
Output format for single node multi-pass, non-preprocessed option

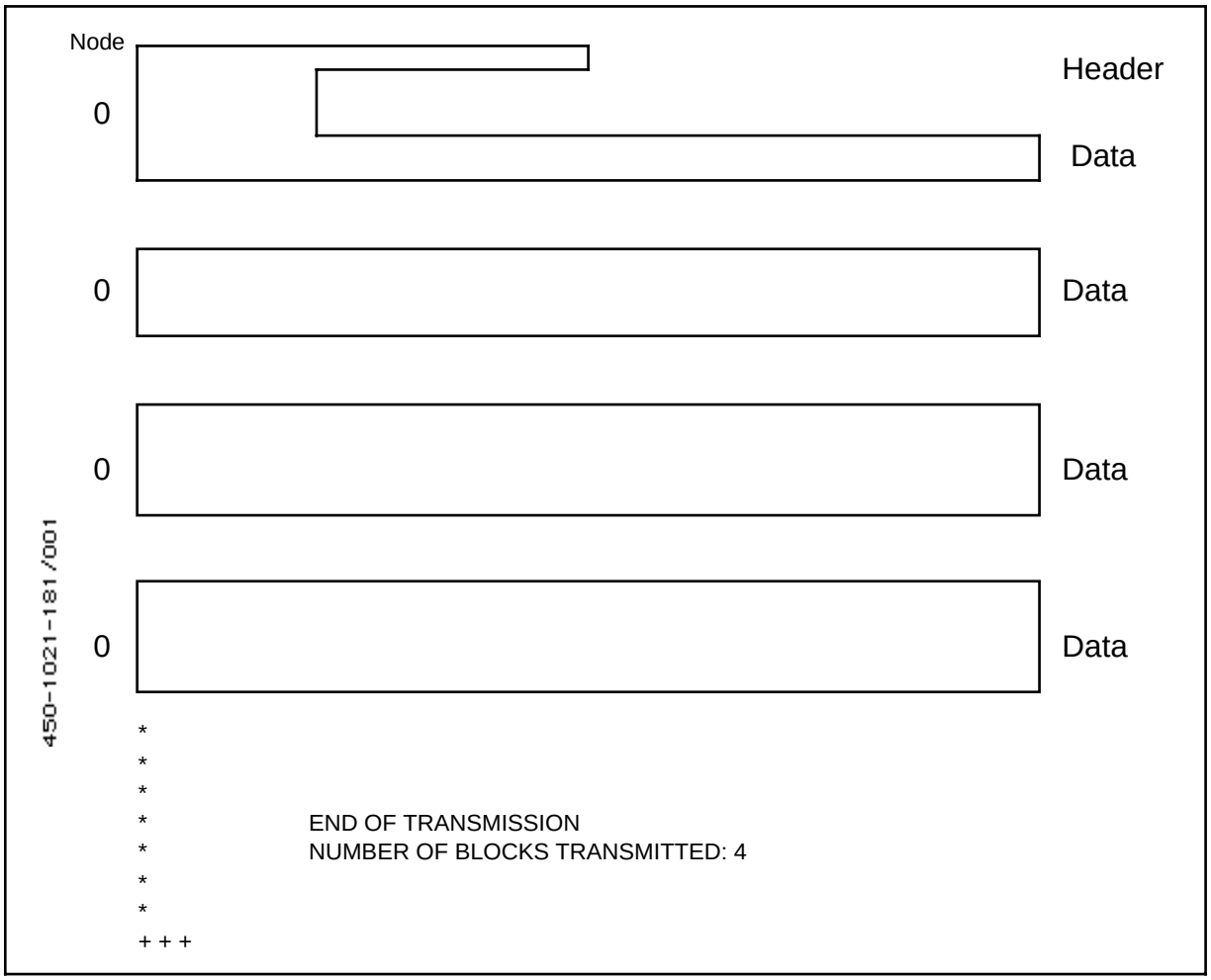


Figure 4-7
Output format for multi-node single pass, non-preprocessed option

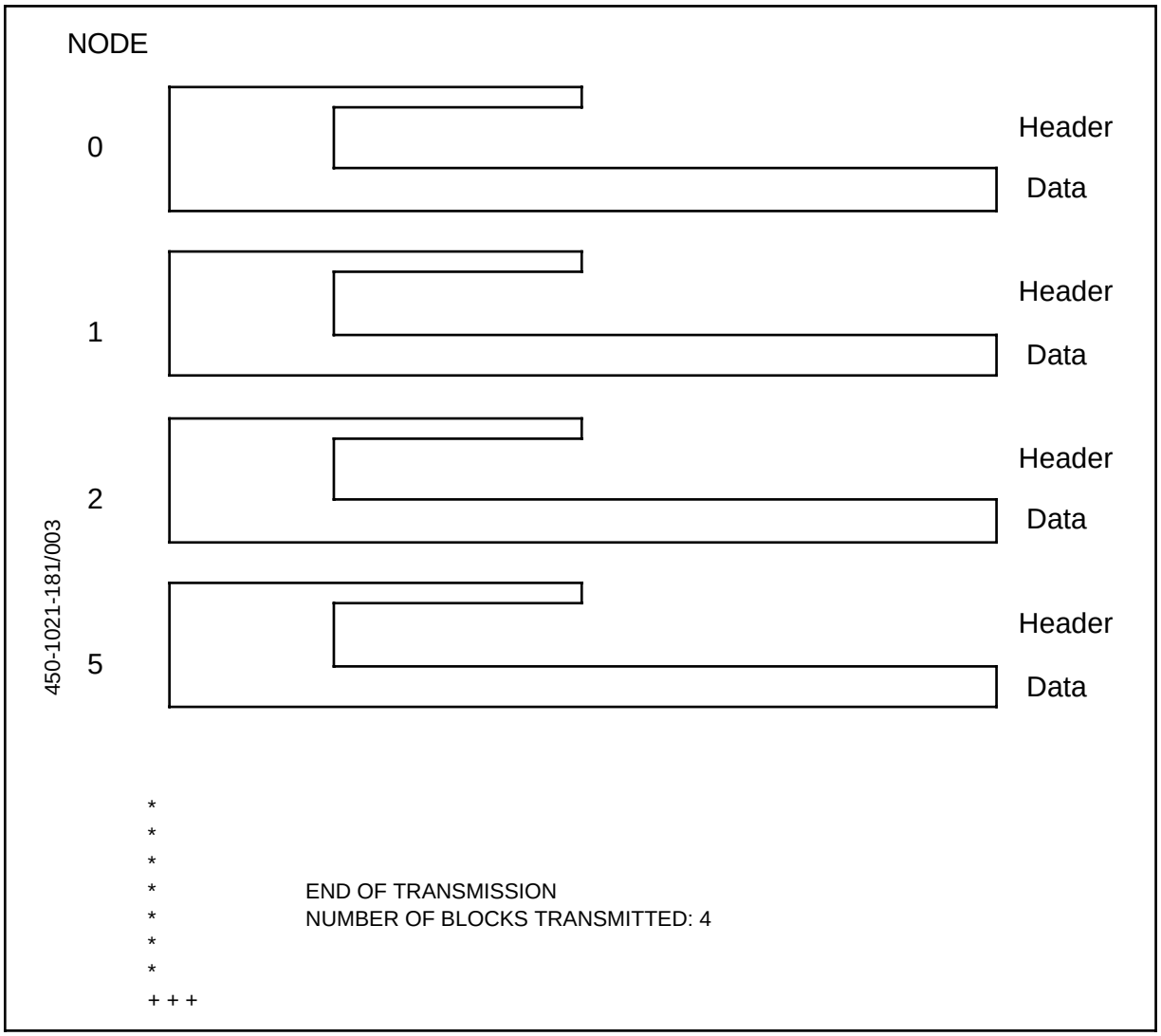
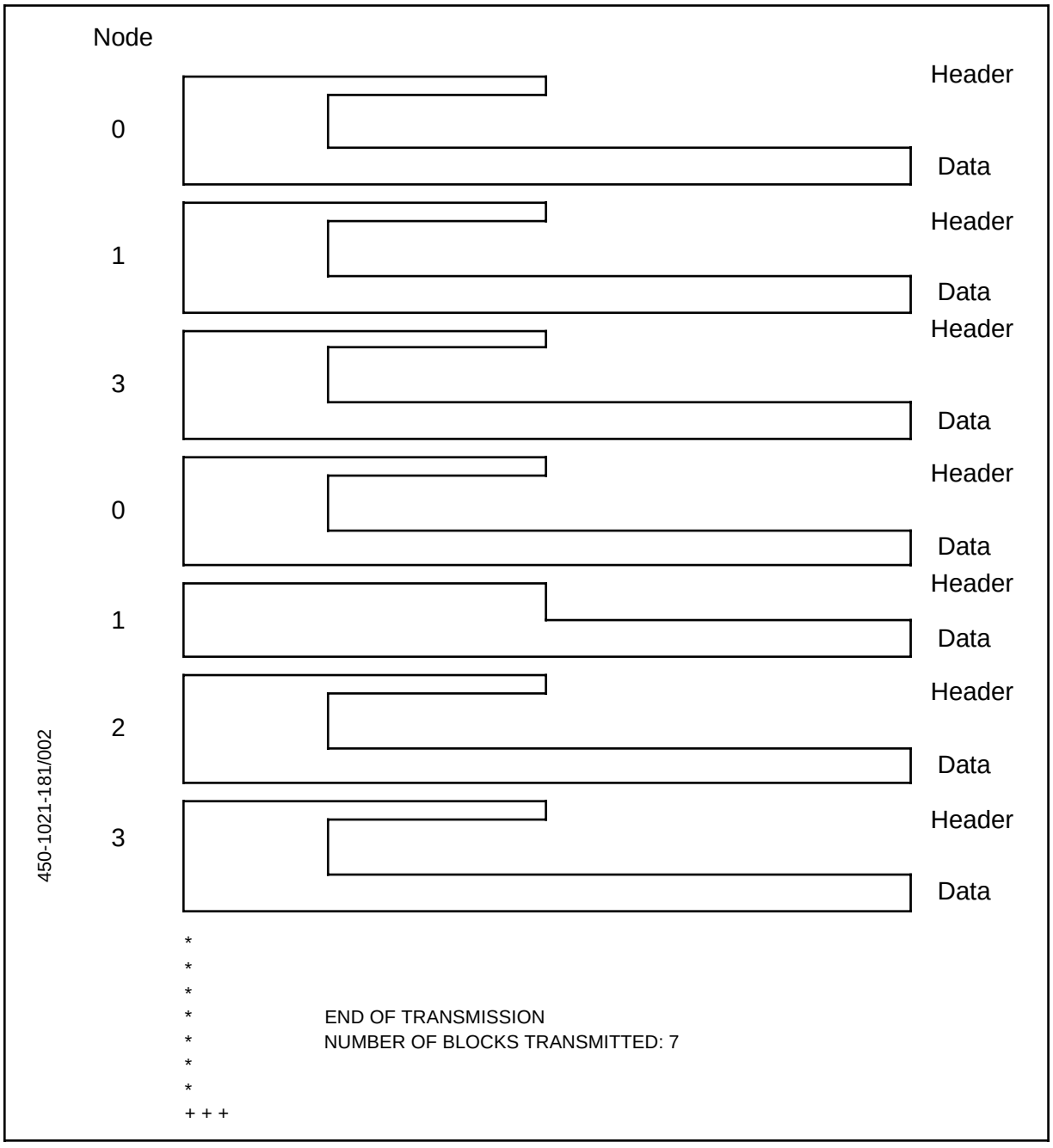


Figure 4-8
Output format for multi-node multi-pass, non-preprocessed option



Preprocessed SMDR call records

This feature option makes minor changes to the format as given in Chapter 4. The following six SMDR call record fields have been redefined to allow the use of stable DNC names in ASCII character form which eliminates the necessity of downstream processing of C2C2 translation records:

(a) Originating Identification

(b) Terminating Identification

(c) Customer Group Number

These subfields appear in more than one record location:

(d) Trunk Group ID

(e) Virtual Facility Group (VFG) ID

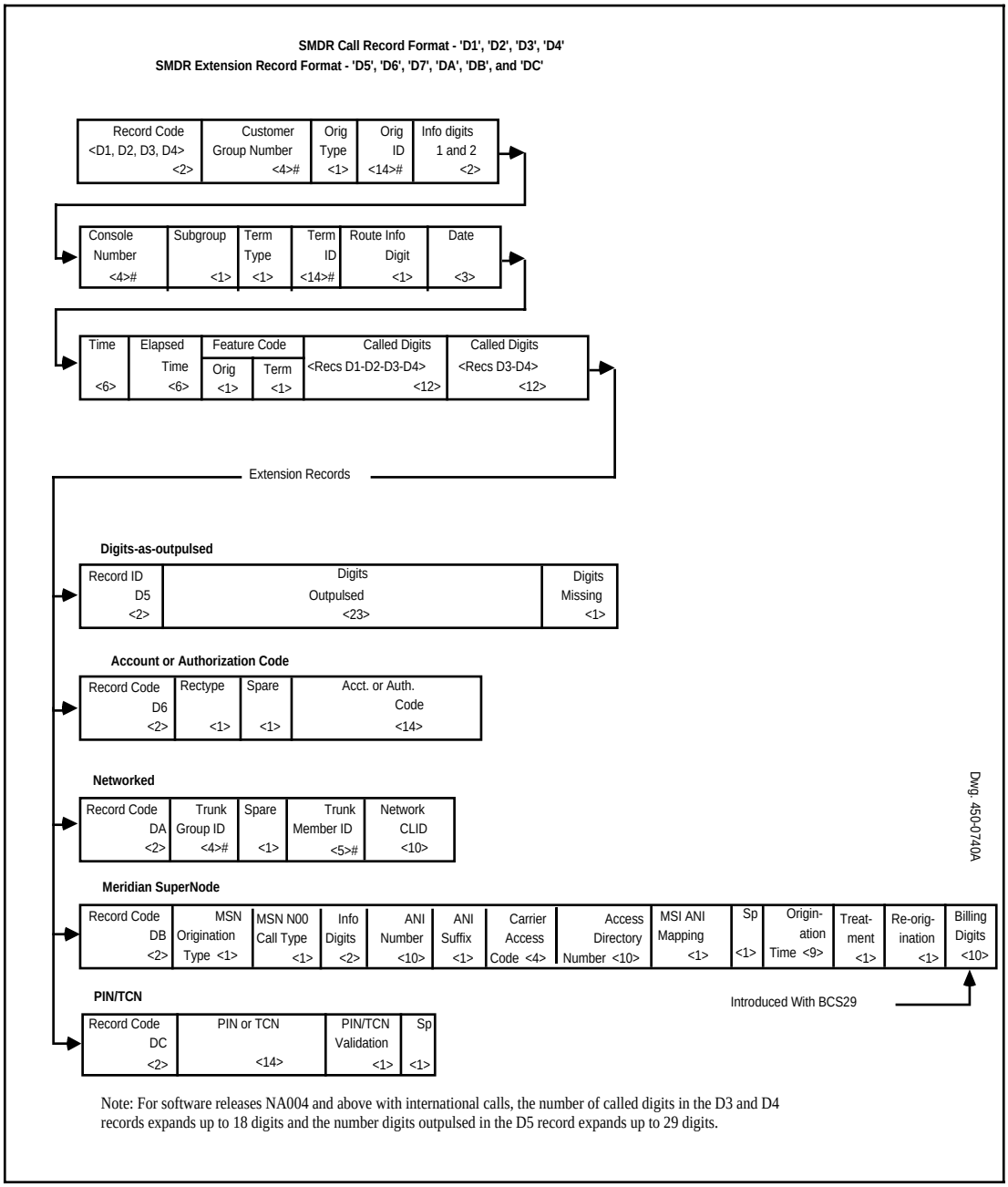
(f) Attendant Console Number

Refer to Figures 5-1, 5-2, and 5-3 for Preprocessed SMDR Call Record Formats. All numbers between "<" and ">" indicate record field length in bytes. All records contain ASCII characters only. Filler and spare field bytes are set to the ASCII space character (X'20').

All fields modified by preprocessing are indicated by a "#" following the field length indicator; for example "<n>#".

Note: There are no redefined fields in the C1C1 Header Records.

Figure 5-1
Preprocessed SMDR call record format



Note: For software releases NA004 and above with international calls, the number of called digits in the D3 and D4 records expands up to 18 digits and the number digits outpulsed in the D5 record expands up to 29 digits.

Figure 5-2
Call originating type formats - preprocessed option

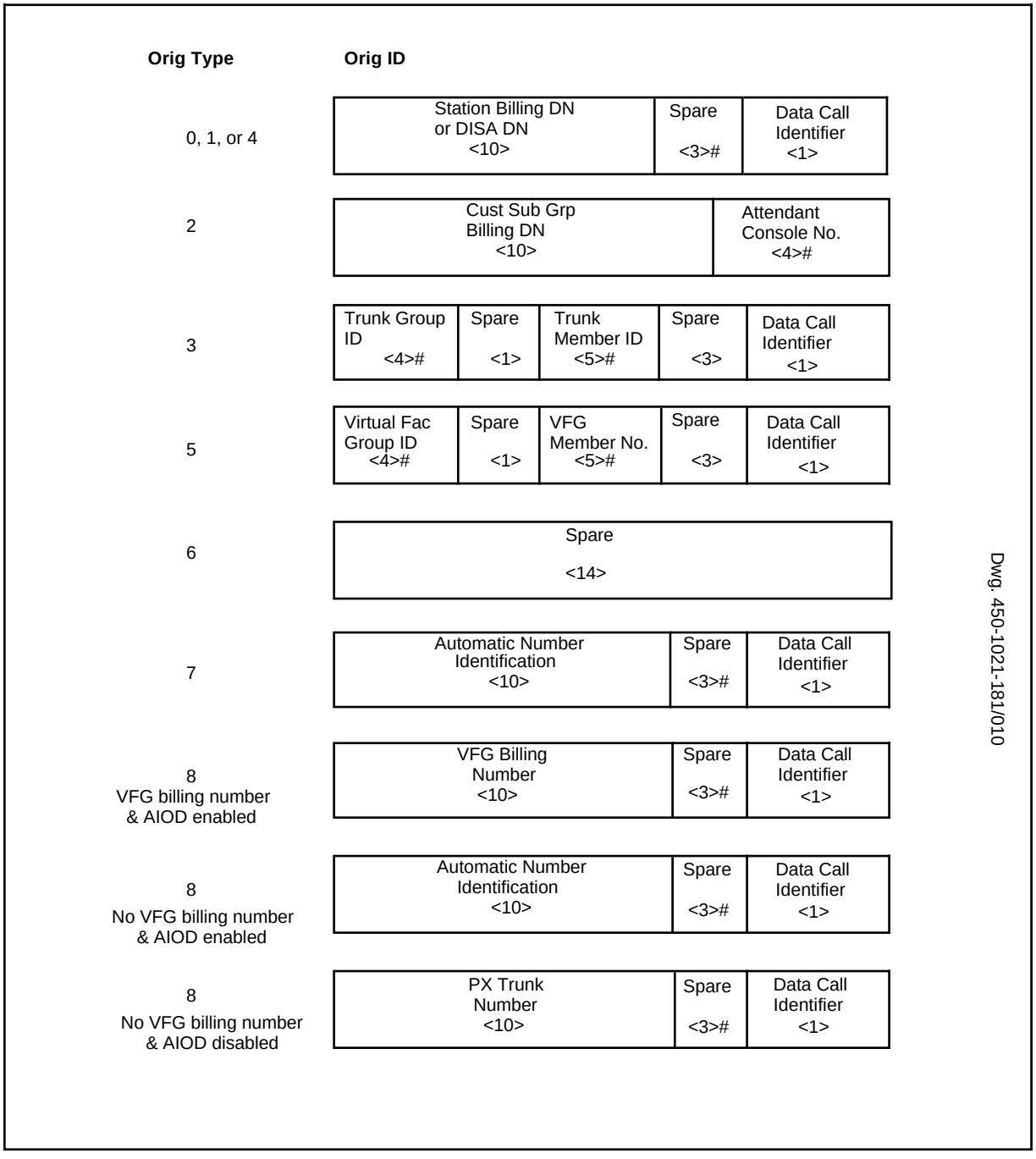
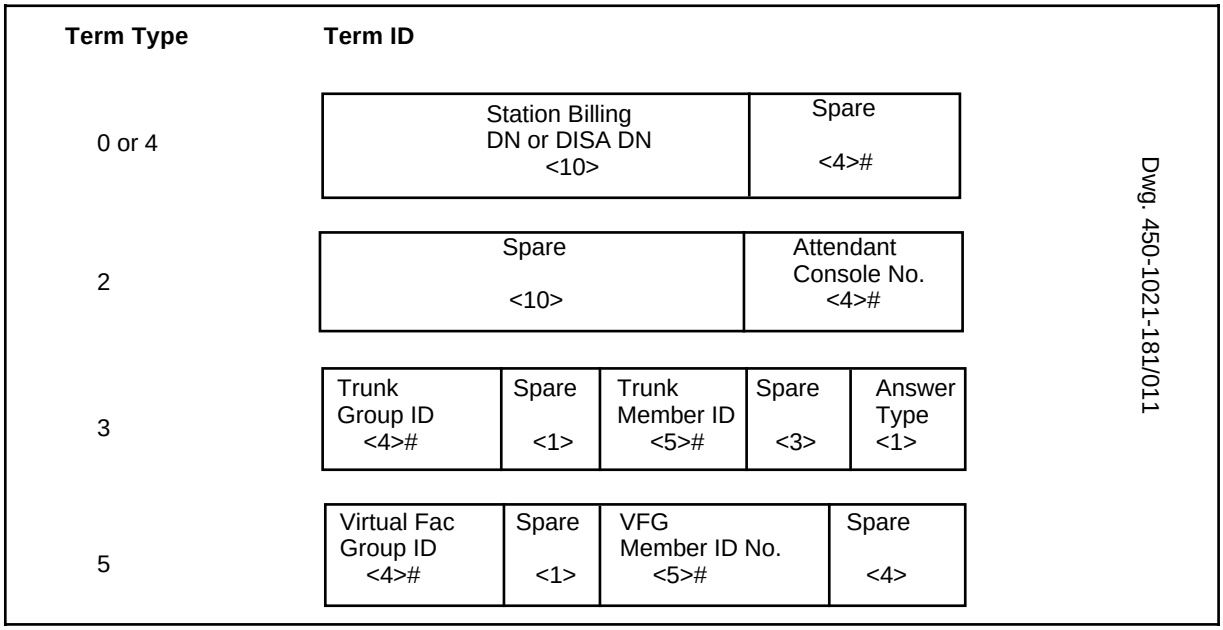


Figure 5-3
Call terminating type formats - preprocessed option



Explanation of preprocessed output data

Each record of Preprocessed SMDR output data is formatted on a single line divided into blocks for each DMS node. As can be seen in Figure 5-4, there is not a C2C2 information area. The C1C1 information area has been processed to present the information in an easier format for the user to read.

As for the Non-Preprocessed option described in Chapter 4, the Preprocessed option will produce the following four format types:

- Single Node Single Pass
- Single Node Multi-Pass
- Multi-Node Single Pass
- Multi-Node Multi-Pass

Single node single pass

Figure 5-4 is an example of the format for a single node single pass Preprocessed SMDR data transmission job.

Referring to Figure 5-4, the output starts with a header containing the customer ID, location, and the type of data. Asterisks in the left margin are used to bracket the header. Following the header is the C1C1 information area. This C1C1 area consists of only two records (only two records were changed since the last pass) which are followed by the end of transmission identifier (bracketed by asterisks in the left margin).

Single node multi-pass

Figure 5-6 is representative of the information contained a single node multi-pass Preprocessed SMDR data transmission job. The first block contains a header and C1C1 data areas, each of the other blocks contain C1C1 data only.

The final block is followed by the end of transmission identifier.

Multi-node single pass

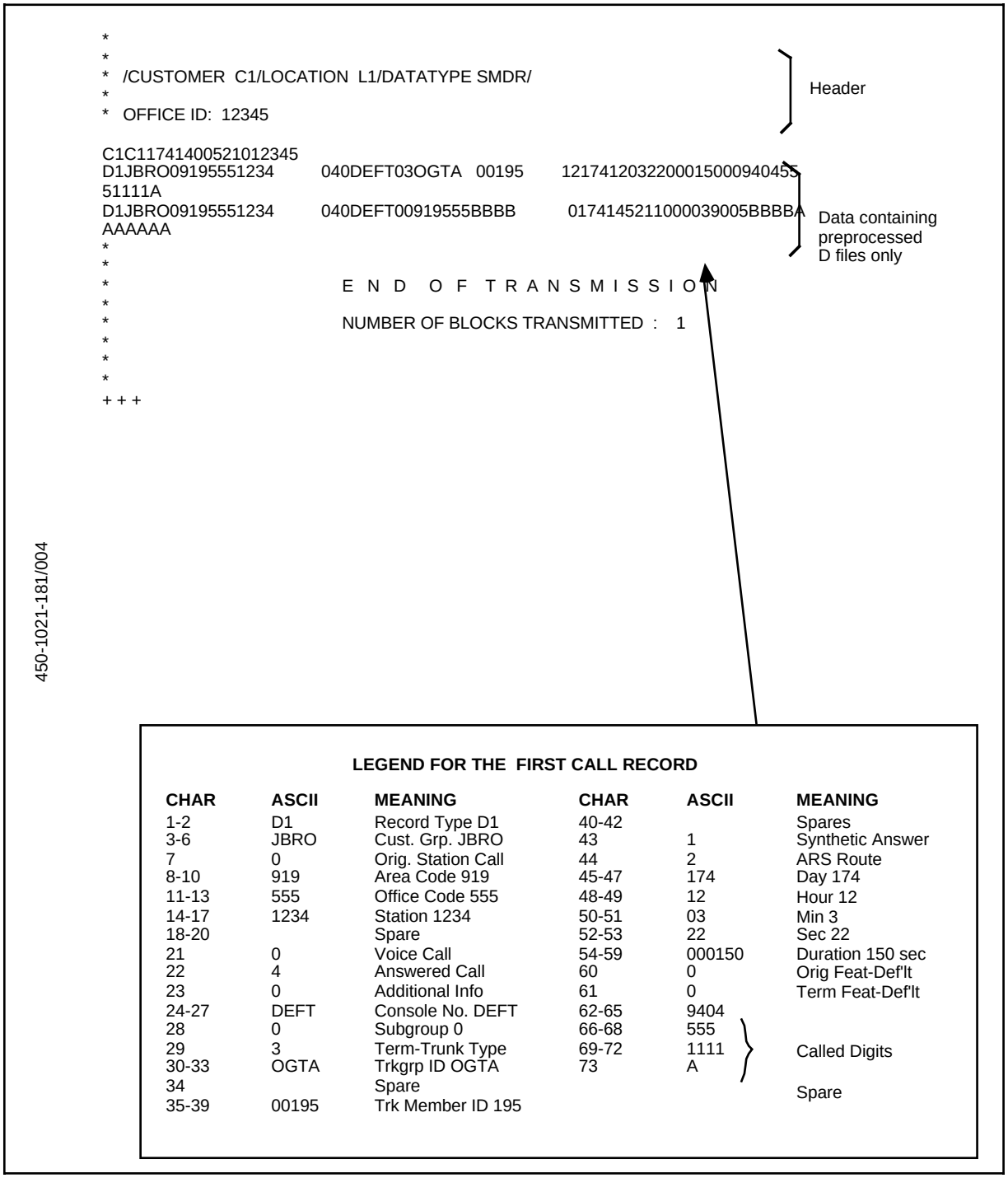
Figure 5-7 is an example of a multi-node single pass Preprocessed SMDR data transmission job. In this example, each block contains a header and the C1C1 information. Also, only DMS nodes 0, 1, 2, and 5 had information. The data transmission ends with the normal end of transmission identifier.

Multi-node multi-pass

Figure 5-8 is an example of a multi-node multi-pass Preprocessed SMDR data transmission job. In this example only two passes are shown.

In this example, each block has a header because it is a different node every time. The data transmission ends with the normal end of transmission identifier.

Figure 5-4
Sample header and data block content-preprocessed option



LEGEND FOR THE FIRST CALL RECORD

CHAR	ASCII	MEANING	CHAR	ASCII	MEANING
1-2	D1	Record Type D1	40-42		Spares
3-6	JBRO	Cust. Grp. JBRO	43	1	Synthetic Answer
7	0	Orig. Station Call	44	2	ARS Route
8-10	919	Area Code 919	45-47	174	Day 174
11-13	555	Office Code 555	48-49	12	Hour 12
14-17	1234	Station 1234	50-51	03	Min 3
18-20		Spare	52-53	22	Sec 22
21	0	Voice Call	54-59	000150	Duration 150 sec
22	4	Answered Call	60	0	Orig Feat-Def'lt
23	0	Additional Info	61	0	Term Feat-Def'lt
24-27	DEFT	Console No. DEFT	62-65	9404	
28	0	Subgroup 0	66-68	555	
29	3	Term-Trunk Type	69-72	1111	Called Digits
30-33	OGTA	Trkgrp ID OGTA	73	A	
34		Spare			Spare
35-39	00195	Trk Member ID 195			

Figure 5-5
Preprocessed records, un-masked and masked characters

In the former SMDR format, the un-masked, preprocessed spooled D3, D4 and D5 records resemble the following:

D3JBRO09195551234 040DEFT03OGTA 00195 121741203220
00150009404555111 1AAAAAAAAAAAA
D4JBRO09195551234 040DEFT03OGTA 00195 121741203220
00150009404055511 11AAAAAAAAAAAA
D5918006698673AAAAAAAAAA0

The expanded SMDR format for un-masked, preprocessed records is as follows:

D3JBRO09195551234 040DEFT03OGTA 00195 121741203220
00150009404555111 1AAAAAAAAAAAA**AAAAAA**
D4JBRO09195551234 040DEFT03OGTA 00195 121741203220
00150009404055511 11AAAAAAAAAAAA**AAAAAA**
D5918006698673AAAAAAAAAA**AAAAAA**0

In the former SMDR format, the masked, preprocessed spooled D3, D4 and D5 records resemble the following:

D3JBRO09195551234 040DEFT00919555BBBB 017414521100
0039005BBBBAAAAAAAAAAAAAAAAAA
D4JBRO09195551234 040DEFT00919555BBBB 017414521100
0039005BBBBAAAAAAAAAAAAAAAAAA
D5918006698673AAAAAAAAAA0

The expanded SMDR format for masked, preprocessed records is as follows:

D3JBRO09195551234 040DEFT00919555BBBB 017414521100
0039005BBBBAAAAAAAAAAAAAAAAAA**AAAAAA**
D4JBRO09195551234 040DEFT00919555BBBB 017414521100
0039005BBBBAAAAAAAAAAAAAAAAAA**AAAAAA**
D5918006698673AAAAAAAAAA**AAAAAA**0

Figure 5-6
Output format for single node multi-pass, preprocessing option

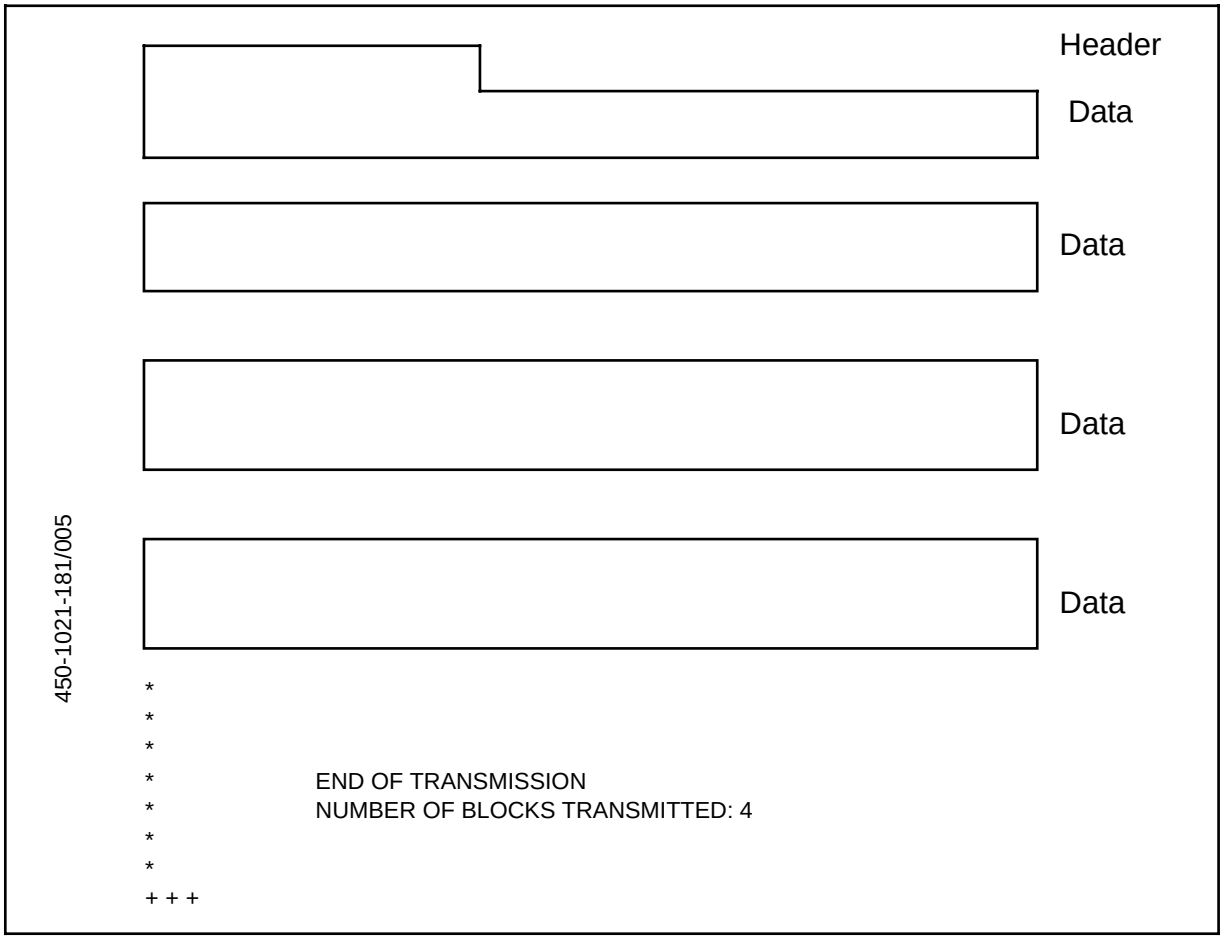


Figure 5-7
Output format for multi-node single pass, preprocessing option

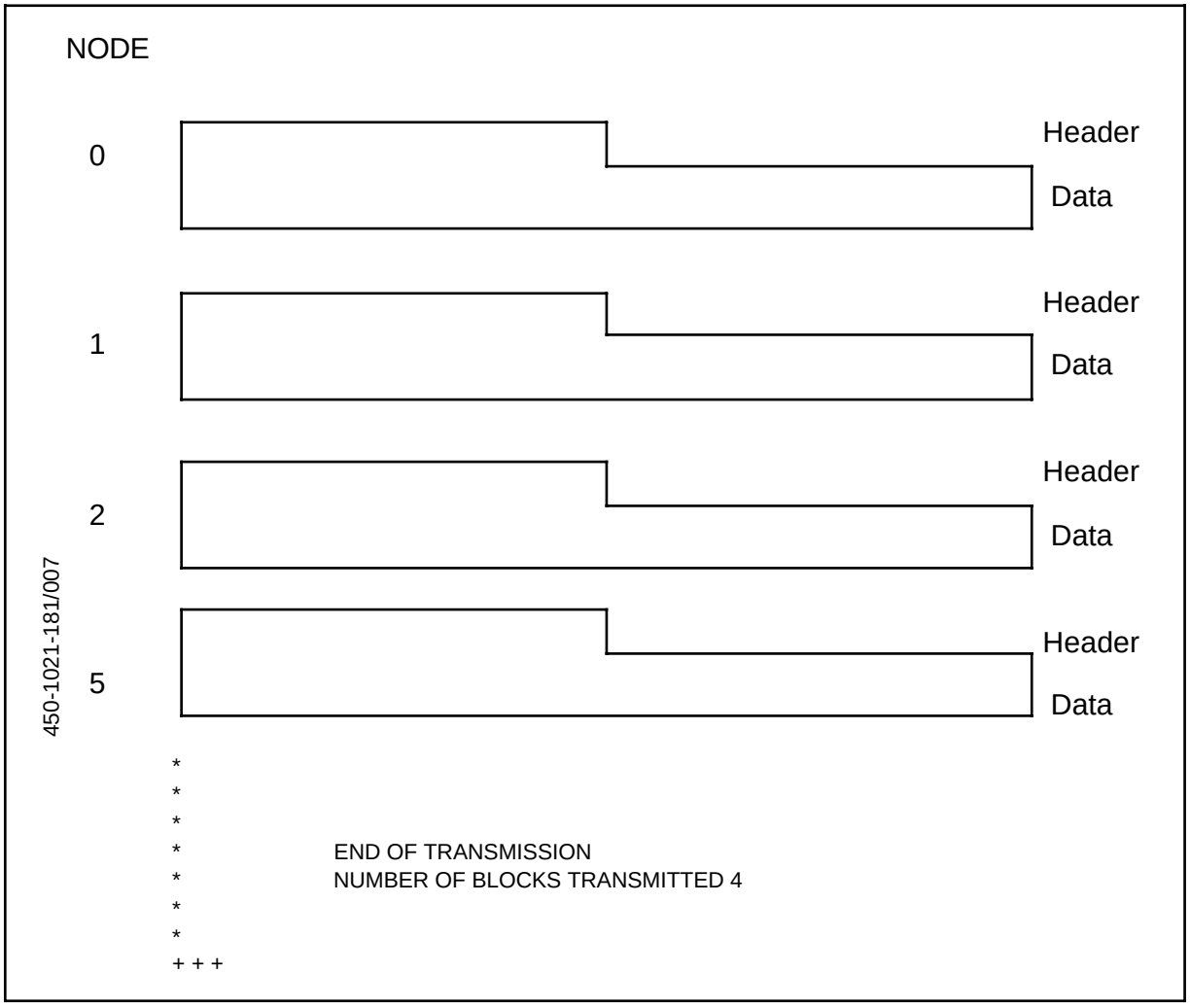
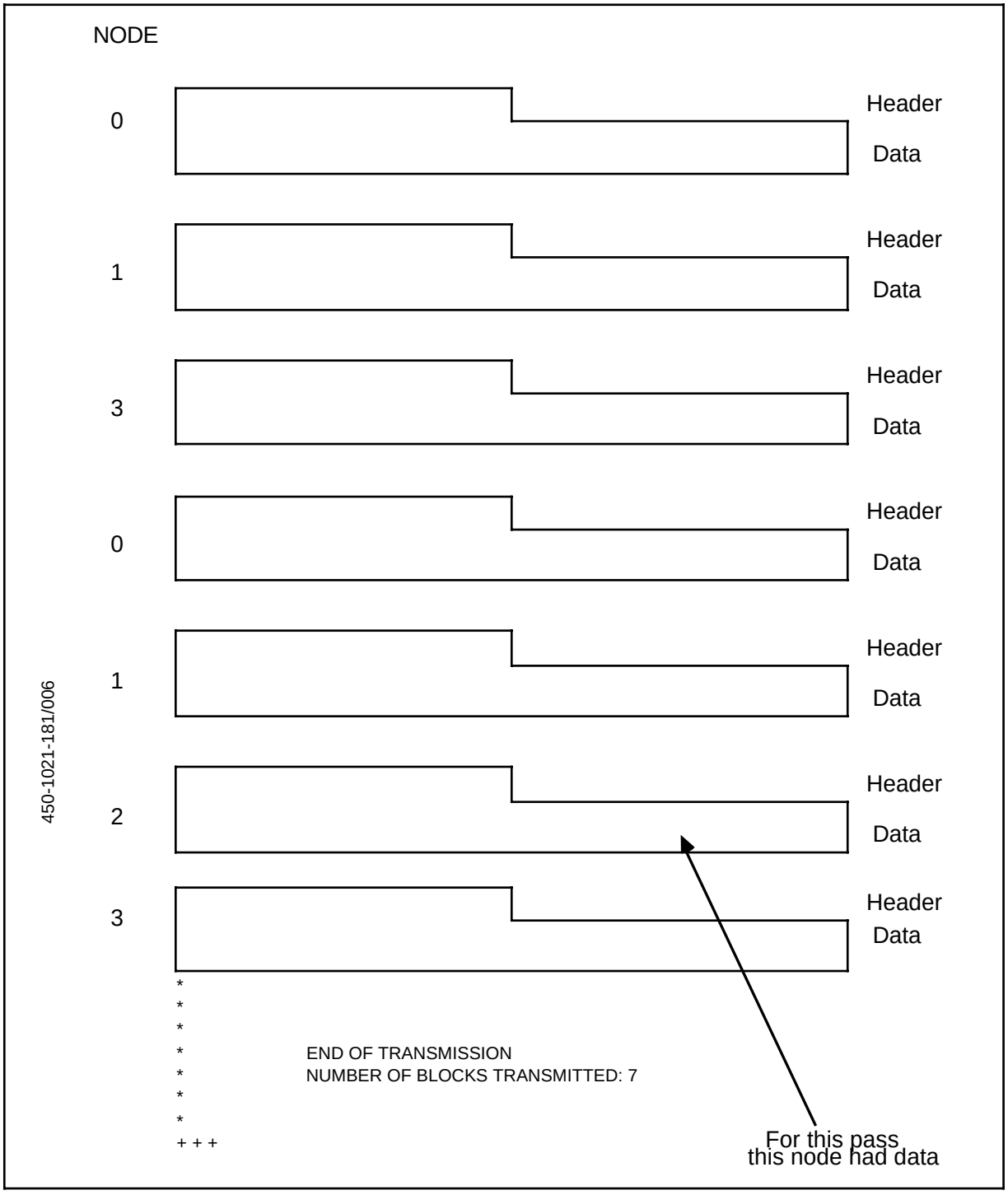


Figure 5-8
Output format for multi-node multi-pass, preprocessing option



Switch/PBX poller records

Types of records available

The Switch / PBX Poller (SPP) is an optional feature of BNM. It enables the collection of call records from many different types of switches and Private Branch Exchanges (PBXs). It converts these records into DMS SMDR format and stores them on BNM as if they were DMS-family SMDR records. However, since the other switches may not provide the same record details as DMS nodes, many of the record types described in previous sections of this NTP will not be produced.

This section summarizes the record types that are available from nodes accessed via the SPP. It also describes any differences, where applicable, between these records and their DMS SMDR equivalents.

The following table indicates which of the DMS SMDR call records are available from the SPP (assuming that the records are available from the non-DMS node):

Header Code	Record Type	Available
C1C1	Block Header	√
C2C2	Data Group Block Header	√
FA, FB, FC	Rotation	
FD	Restart	
FE	Clock Change	
A, C, K	Translation	√
V	Translation	
E	Termination	√
D1, D3	SMDR Call	√
D2, D4	NERVE CDR	
D5	Digits as Outpulsed	√
D6	Account / Authorization	√
D8	Military Call	
D9	Military DAO	
DA, DB, DC	Extension Records	

Block header (C1C1)

The block header (C1C1) record produced via SPP has the same format as described earlier in this document.

Day and Hour field information is extracted from individual SPP CDR records. The year is determined by analysing the date of the CDR file and the date of the first CDR in the block. The date is the sum of the call start date/time and the call duration.

Block Number is derived internally during conversion of the CDR data, since block numbers are not produced by the SPP.

Office ID consists of the right-most digits of the PBX-ID associated with each group of SPP records. The PBX-ID is defined in the SPP Site Information screen.

Data group block header (C2C2)

The data group block header (C2C2) record produced via SPP has the same format as described earlier in this document.

Data group translator records (A, C, K, V)

The SPP supports the data group translator record types A (attendant console name), C (customer group name), and K (trunk group identifier). The type V (virtual facility group name) is not supported, since it will not be received from non-DMS nodes.

Data group termination record (E)

The data group termination (E) record produced via SPP has the same format as described earlier in this document.

SMDR call records (D1, D3)

The SMDR call records of types D1, D3, D5 and D6 produced via SPP has the same format as described earlier in this document, except as follows:

(a) ***Customer Group Number.*** For those non-DMS nodes that support multiple customers, the customer number within each SPP CDR record is used. For those that do not, the customer group number specified for the node in the Facility Mapping screens of the SPP is used. If none is specified, the field is set to 0.

(b) ***Origination Type.*** The following origination types (ORIGTYPE) may be produced via an SPP:

0	station
2	attendant console
3	trunk
6	six port conference circuit originator
A	unknown origination type

(c) ***Origination Identification.*** The origination identification record produced by the SPP from a non-DMS node is as follows:

Orig-Type	Digit Position	Definition
0	01-03	Area Code
(note 1)	04-06	Office ID
	07-10	Station ID
	11-12	Spare
2	01-10	Attendant Console Number
(note 2)	11-12	Attendant Console Number
3		(as described in Chapter 4 of this document)
6		(as described in Chapter 4 of this document)
A	01-12	All positions are spooled as ASCII “A” (X'41')

Note 1: The digits for the call origination identification are right justified and padded to a full length of 10 digit positions. The padding characters are:

ASCII "A" (X'41') for non-preprocessed output.

ASCII "space" (X'20') for preprocessed output.

Note 2: The Attendant Console number in digit positions 01-10 is left-justified and padded to a full length of 10 digit positions. The padding characters are:

ASCII "A" (X'41') for non-preprocessed output.

ASCII "space" (X'20') for preprocessed output.

(d) ***Information Digits 1 And 2.*** Digit 1 is always 0. Digit 2 can be 0 (non-attendant extended) or 2 (attendant extended). No other information is available.

(e) ***Console Number.*** If a call was extended by an attendant, the corresponding console number recorded in this field is spooled as an ASCII representation of a hexadecimal number (e.g., "0" "E" represents 14). ASCII “FF” is spooled if empty.

(f) ***Subgroup.*** Subgroup is always unused and set to 0.

(g) ***Call Terminations.*** The following terminations are produced:

0	station
2	attendant console
3	trunk
A	unknown termination type

(h) ***Termination Identification.*** The termination identification record produced by the SPP from a non-DMS node is as follows:

Term-Type	Digit Position	Definition
0	01-03	Area Code
(note 1)	04-06	Office ID
	07-10	Station ID
	11-12	Spare
2	01-10	Attendant Console
(note 2)	11-12	Attendant Console Number
3 (note 3)		(as described in Chapter 4 of this document)
A	01-12	All positions are filled with ASCII “A” (X'41')

Note 1: The digits for the call termination identification are right justified and padded to a full length of 10 digit positions. The padding characters are:

ASCII "A" (X'41') for non-preprocessed output.

ASCII space (X'20') for preprocessed output.

Note 2: The Attendant Console number in digit positions 01-10 is padded for its full length of 10 digit positions. The padding characters are:

ASCII "A" (X'41') for non-preprocessed output.

ASCII "space" (X'20') for preprocessed output.

Note 3: Since there is no way of determining how a call was answered, electrical answer (0) is always used for digit 12.

(i) ***Route Information Digit.*** Route Information is produced as described in Chapter 4 of this document. If more than 23 digits were dialed, the "digits missing" event is considered to be "true," and the digit will be one of 1, 3, 5, or 7.

(j) ***Start Time.*** Start Time is produced as described in Chapter 4 of this document.

(k) ***Elapsed Time.*** Elapsed Time is produced as described in Chapter 4 of this document.

(l) ***Originating Feature Codes.*** Because of the generic nature of the SPP output, only the following feature codes are supported:

0	default
3	6-port conference, attendant or meet-me (when origtype = 6)

(m) ***Terminating Feature Codes.*** The following terminating codes are available:

0	default
3	6-port conference, attendant or meet-me
5	call-back queuing or ring-again

(n) ***Called Digits.*** Up to 24 digits are stored in SPP records. These include the "*" and "#" special feature identifiers. D1 records spool up to 12 digits, and D3 records spool up to 24 digits. Digits are left justified and padded with ASCII "A" (X'41') for non-preprocessed output, and ASCII spaces, (X'20'), for preprocessed output.

Dialed Digit	Hex Value
0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
*	B
#	C

Extension records

The following types of extension records are available through the SPP.

Digits as outpulsed record (D5)

Digits-as-Outpulsed records are generated whenever actual dialed digits have been translated. The Called Digits field of the associated D1 or D3 call record are overwritten signifying that the called digits are not available. The characters used are:

ASCII "A" (X'41') for non-preprocessed output.

ASCII space (X'20') for preprocessed output.

Account or authorization code record (D6)

These records are available as defined in Chapter 4 of this document. SPP records have 20 digits available, but only the left-most 14 are used. For records containing both account and authorization code digits, the account code digits precede the authorization code digits.

Abbreviations

ACCT	Account
ANI	Automatic number identification
ARS	Automatic route selection
ASCII	American standard code for information interchange
ATD	Audio tone detection
ATTCONS	Attendant consoles
AUTH	Authorization
BCD	Binary coded decimal
BCS	Batch change supplement
BNM	Business network management
CDR	Call detail recording
CHAR	Character
CLD	Called
CLLI	Common language location identifier
CPE	Customer premises equipment
CPU	Central processing unit
CR	Carriage return
CUSTGRP	Customer group
DAO	Digits-as-outpulsed
DCI	Data call identifier
Def'lt	Default
DIRP	Device independent recording package
DISA	Direct inward switch access
DMS	Digital multiplex system
DMS node	A member of the DMS-100 family of digital switches. It includes the variants DMS-100, DMS-200, DMS-250, and DMS-300.
DN	Directory number
DNC	Dynamic network control system

DSN	Decimal sequence number
EOF	End Of file
ERWT	Expensive route warning tone
Feat	Feature
ID	Identification
LAN	Local area network
LF	Line feed
LIU	LAN interface unit
MDC	Meridian digital centrex
MMI	Man machine interface
NERVE	Network evaluation, recording and verification
NIS	Northern interface specification
NOP	Network operations protocol
OPT	Optional
Orig	Originating
ORIGID	Originating identification
PC	Personal computer
RAO	Records-as-outpulsed
RSN	Record sequence number
SMDR	Station Message Detail Recording
SP	Space
SPB	Special billing
Term	Terminating
TERMID	Terminating identification
VFG	Virtual facility group
VIRTGRPS	Virtual groups

Network Operations Systems

Business Network Management

SMDR Interface Specification

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