Interface Document
BID-0020
November 1995

*CALL MANAGEMENT*Ô
SERVICE

Terminal-to-Network Interface

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DOCUMENT HISTORY

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Readers are specially advised that the technical requirements contained herein may change.

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1.0 SERVICE DESCRIPTION

The *Call Management*Ô Service, where available, provides Subscribers with call related information with respect to 800, operator completed, DDD and WATS calls which originate and terminate on the Subscribers public switched telephone network access line located in Bell Canada Territory. Detail information is provided electronically and is transmitted to the Subscribers CPE over a dedicated access **Data**pac™ facility.

2.0 FEATURE DESCRIPTION

Terminals utilizing the features of this interface will receive call related information, for calls originating and terminating on the Subscribers *Call Management*Ô Service, from the network over a dedicated access Datapac facility. This information, transmitted in a binary format, may contain details identifying the date and time, origin and destination of the call, the dialed number, disposition of the call (e.g. answered calls will include duration of the call and unanswered calls will include ring time).

3.0 DATAGRAM PROTOCOL

3.1 Characteristics

- The protocol uses 8-bit data octets. A sequence of octets is used to transmit a data message (i.e. a datagram) from Stentor Resource Centre Inc. Systems to the *Call Management*Ô Service Subscribers CPE. No data is transmitted from the Subscribers CPE to Stentor Resource Centre Inc. Systems.

- Bell systems transmit octets in streams. The subscribers CPE must establish and maintain synchronization on the datagram pattern contained within this stream. Idle periods (i.e., periods of no data transmission) may occur between datagrams.

- All octets are transmitted using binary encoding of the data types defined within the protocol.

- Data parameters which are not recognized by the terminal should be ignored (i.e., the corresponding data should not be processed).

- Datagrams will be transmitted only when the Subscribers CPE is connected (via a **Data**pac connection) to Bell's systems. All datagrams which correspond to 800, DDD, etc. calls which occur when the Subscribers CPE is NOT connected are discarded by Bell's systems and cannot be recovered or re-transmitted.

- Datagrams received in error at the Subscribers CPE (e.g., with an invalid checksums) will not be re-transmitted. Datagrams received in error should not be processed.

- Call Detail Messages, once created, will be routed to a (connected) Subscribers CPE within a 48 hour period of the call being placed.

3.2 Datagram Layout

All messages are transferred in a datagram format. Each datagram contains a header portion and an (optional) variable length data portion. The generic layout of a datagram is illustrated in Figure 1.

SYNC	SYNC	MESSAGE TYPE	DATA LENGTH	HEADER CHECKSUM	DATA	DATA CHECKSUM

Table 1: Datagram Layout

Table 2 provides a brief description of each parameter contained within a datagram. Note that OFFSET represents the position of datagram parameter relative to the start of the datagram.

Offset (in octets)	Parameter Name	Size (in octets)	Description
0	SYNC	1	An octet containing the value: 0x16.
1	SYNC	1	An octet containing the value: 0x16.
2	MESSAGE TYPE	1	Specific type of message conveyed. 0x00 - HEARTBEAT MESSAGE. 0x01 - CDM (CALL DETAIL MESSAGE) 0x02 - 0xFF RESERVED.
3	DATA LENGTH	1	Length (in octets) of the variable length DATA PARAMETER.
4	HEADER CHECKSUM	1	Sum of the contents of octets 0 through 3 Module 256.
5	DATA	1 to 255	Contents Depends on MESSAGE TYPE. See Section 3.3.5 for details.
5 + (DATA LENGTH)	DATA CHECKSUM	1	Sum of octets 5 through 5+(DATA LENGTH -1) Module 256.

Table 2: Datagram Parameters

Note: Octets 0 through 4 are referred to as the Datagram Header.

3.3 Datagram Parameter Descriptions

The following sections provide detailed descriptions of the parameters typically found in the Datagram Header portion of a datagram message.

3.3.1 SYNC

One (1) octet containing the value 0x16. Two sequential SYNC octets in the data stream may indicate the start of a datagram. Presence of an actual datagram should be confirmed with HEADER CHECKSUM, and if present, DATA CHECKSUM verification. Thus the combination of SYNC and CHECKSUM octets provide the capability to recognize the datagram pattern within the datagram streams transmitted by Stentor Systems.

3.3.2 MESSAGE TYPE

One (1) octet, the value of which defines the type of message being conveyed by the datagram. It also defines the contents of the DATA PARAMETER. Valid MESSAGE TYPE values are listed in Table 2.

HEARTBEAT MESSAGE datagrams will be periodically transmitted if and only if there are no other messages to be transmitted. HEARTBEAT MESSAGE datagrams ensure that the transmission facility does not remain idle for extended periods of time and thus give the appearance of being out of service.

When a **Data**pac connection is first established between the Subscribers CPE and Stentor systems, several HEARTBEAT MESSAGE datagrams are immediately transmitted. This allows the Subscribers CPE to recognize the datagram pattern prior to the transmission of any Call Detail datagrams.

3.3.3 DATA LENGTH

One (1) octet, the value of which defines the number of octets contained in the variable length DATA PARAMETER. The DATA CHECKSUM is NOT included in the DATA PARAMETER (length).

A value of zero (0) indicates that neither the DATA PARAMETER nor the DATA CHECKSUM is present (e.g., HEARTBEAT MESSAGES have no DATA PARAMETER thus have a DATA LENGTH value of 0).

3.3.4 HEADER CHECKSUM

One (1) octet, the value of which should be identical to the result of the following calculation: ((SYNC + SYNC + MESSAGE TYPE + DATA LENGTH) Module 256).

Should the HEADER CHECKSUM value calculated by the subscribers CPE be different from the transmitted HEADER CHECKSUM value then the datagram should be considered invalid and should not be processed.

3.3.5 Data Parameter

N, where 1<=N<=255, octets of data associated with the message being conveyed. The value of N is identical to the value of the DATA LENGTH parameter.

The specific layout of a DATA PARAMETER is dependent upon the value of the MESSAGE TYPE parameter as illustrated in Table 3.

MESSAGE TYPE Value	Layout
0x00 (HEARTBEAT)	None
0x01 (Call Detail record)	Call Detail Message See Section 4.1

Table 3: Message type to Data Parameter Layout

3.3.6 DATA CHECKSUM

One (1) octet, the value of which should be identical to the result of the following calculation: ((Sum of all octets in the DATA PARAMETER) Module 256), where the number of octets in the DATA PARAMETER is defined by the value of the DATA LENGTH octet.

Should the data checksum value calculated by the subscribers CPE be different from the transmitted DATA CHECKSUM value then the datagram should be considered invalid and should not be processed.

4.0 DETAILED MESSAGE DESCRIPTIONS

The following sections provide additional details as to the syntax and semantics of the fields found in the Data parameter layout.

Note that, unless specifically listed, no particular value can be attributed to, or assumed for, any data (sub) parameter which is described as UNDEFINED. Parameters with UNDEFINED values must not be processed and should be discarded.

4.1 Call Detail Message Layout

Figure 2 illustrates the layout of the DATA PARAMETER field in a datagram when the MESSAGE TYPE parameter contains a CALL DETAIL MESSAGE value (0x01):

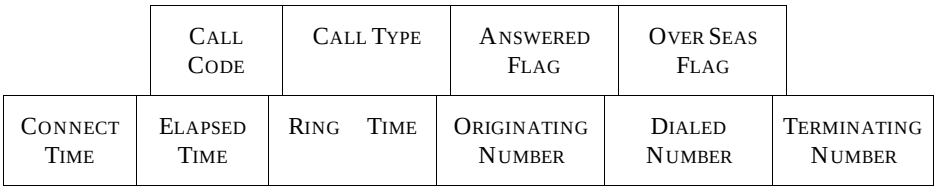

Table 4: Call Detail Message Layout

Table 4 provides a brief description of each (sub)parameter contained within a CDM datagram DATA PARAMETER. Note that OFFSET represents the position of a (sub)parameter relative to the start of the DATA PARAMETER.

Offset (in octets)	Parameter Name	Size (in bytes)	Description
0	CALL CODE	4	Determines specific Call Code (i.e. DDD, 800 Advantage)
4	CALL TYPE	4	Specifies where call was made from
8	ANSWERED FLAG	1	Notifies whether call answered
9	OVERSEAS FLAG	1	Notifies whether call is overseas
10	CONNECT TIME	4	Time and date that the call was placed
14	ELAPSED TIME	4	Elapsed time of the call in seconds, including the ring time
18	RING TIME	4	The total time of the phone ring in seconds before call is answered
22	ORIGINATING NUMBER	21	The phone number of the caller
43	DIALED NUMBER	21	The phone number dialed by the caller
64	TERMINATING NUMBER	21	The phone number of the person who actually answered the call

Table 5: Call Detail Message Parameter descriptions

4.2. Call Detail Message Parameters

The following sections provide detailed descriptions of the parameters typically found in the DATA PARAMETER of a datagram message conveying a CALL DETAIL MESSAGE.

4.2.1 Call Code

The Call code is Four octets in length. It is stored in signed long integer format in network byte order with the most significant byte coming first. It describes the type call being made. The following is a list of possible call codes;

- When the call code is equal to 006 then the call is Direct Distance Dial
- When the call code is equal to 142 then the call is 800 Advantage
- When the call code is equal to 008 then the call is INWATS
- When the call code is equal to 062 then the call is OUTWATS

4.2.2 Call Type

The Call type is Four octets in length. It is stored in signed long integer format in network byte order with the most significant byte coming first. It describes the type call being made. The following is a list of possible call types;

- When the call type is equal to 0 then the call is for unknown call types
- When the call type is equal to 1 then the call is for internal purposes
- When the call type is equal to 2 then the call is Originating call
- When the call type is equal to 3 then the call is a Terminating call
- When the call type is equal to 4 then the call is for Operational measurements
- When the call type is equal to 5 then the call is for internal purposes
- When the call type is equal to 6 then the call is an Operator intercept
- When the call type is equal to 7 then the call is an Audit record

4.2.3 Answered Flag

The Answered Flag is one octet in length and is stored in ASCII Character format. It describes whether the call was answered or not. The following displays the possible values for this field;

- When the answered flag is 0x00 then the call was unanswered
- When the answered flag is 0x01 then the call was answered
- When the answered flag is 0xFF then the status is unknown

4.2.4 Overseas Flag

The Overseas flag is one octet in length and is stored in ASCII Character format. It identifies calls as coming from overseas or not. The following lists the possible values of the field;

- When the overseas flag is equal to 0x00 then the call was not an overseas call
- When the overseas flag is equal to 0x01 then the call was an overseas call
- When the overseas flag is equal to 0xFF then the status of the call is unknown

4.2.5 Connect Time

The connect time is four octets in length. It is stored in signed long integer format in network byte order with the most significant byte coming first. It contains both the time and date of the call. The time is recorded as the UNIX standard of the amount of seconds after 00:00:00 GMT, Jan 1, 1970.

4.2.6 Elapsed Time

The Elapsed Time field is four octets in length. It is stored in signed long integer format in network byte order with the most significant byte coming first. It identifies the total time of the call including ring time. Elapsed Time is stored as the number of total seconds.

4.2.7 Ring Time

The Ring Time field is four octets in length. It is stored in signed long integer format in network byte order with the most significant byte coming first. It identifies the total ring time, in seconds, before the call was answered.

4.2.8 ORIGINATING NUMBER

The ORIGINATING NUMBER parameter is 21 octets in length and is stored in ASCII Character format. It may contain one of the following formats;

- A ten (10) digit telephone number in the form NPANXXDDDD which corresponds to the telephone number of the calling party.
- A six (6) digit telephone number will be reported if the actual originating telephone number is not available or has been suppressed. This would be in the format NPANXX.
- Overseas calls contain extra digits depending on the country of origin.

4.2.9 DIALED NUMBER

The Dialed number parameter is 21 octets in length and is stored in ASCII Character format. It contains the telephone number in the form NPANXXDDDD which corresponds to the original dialed number (i.e., 8005551234).

4.2.10 TERMINATING NUMBER

The Terminating number is 21 octets in length and is stored in ASCII Character format. It contains the actual telephone number that the caller connected to. The called number may be converted or re-directed. For example when the number 18005551234 is dialed it is converted into a 'real' telephone number by the switching equipment. The converted or terminating number will be for an actual line that is in existence like 4165551111.