BID-0008

March, 1991

Visual Message Waiting Indication (VMWI)

Terminal-to-Network Interface

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DOCUMENT HISTORY

1	March 1991	Initial issue

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1.0 SERVICE DESCRIPTION

The introduction of **Visual Message Waiting Indication (VMWI)** on **DMS(™)** will be a part of the development of Integrated Voice Messaging Service (IVMS). The **VMWI** feature provides the means to visually indicate to the subscriber that a message is present in his voice mail box. This service could be offered in conjunction with **Audible Message Waiting Indication (AMWI)** which is described in Bell Canada's Interface Document ID-0009.

This capability, targeted to residential and small business customers, is tentatively scheduled to be introduced to the IVMS subscribers in the second half of 1991.

Initially, the **VMWI** will be rolled-out in Toronto, Montreal, Ottawa and Quebec City. Future deployment will depend upon switch modernization and demand considerations. Although the rating structure for **VMWI** has not been finalized at the time of issue of this document, it is expected that the pricing will be done coincident with the IVMS.

At the time of issue of this document the **VMWI** could potentially be included with the IVMS trials scheduled for Ottawa and Quebec City.

2.0 FEATURE DESCRIPTION

The **VMWI** interface provides a means to alert subscribers to the presence of a voice message or messages in their voice mail box.

To activate or de-activate the **VMWI**, the network transmits an in-band coded message to the ON-HOOK receiving terminal.

The **VMWI** feature can be utilized in a variety of ways by the terminal design. It can also be used in conjunction with other features and services such as Call Management Service (CMS) or Audible Message Waiting Indication (AMWI) to further enhance the features offered by an innovative terminal design.

2.1 Normal ON-HOOK Operation

The one-time data transmission from the network to the terminal can commence at any time. The dormant terminal feature is activated by detection of the channel seizure signal. The channel seizure signal is followed by carrier (mark) signal that is followed by a data message followed by the check sum word. The data message contains the information needed to turn the Message Waiting Notification (MWN) indication ON or OFF.

2.2 Interruption of VMWI Delivery

Should the terminal go OFF-HOOK while the transmission is in progress, the data transmission of the **VMWI** will abort at the point of interruption and the MWN will not be delivered at this time. The IVMS will periodically retest the state of the line until the ON-HOOK condition is detected. The data transmission will commence 3 seconds later.

2.3 Terminal OFF-HOOK

When the terminal is OFF-HOOK before the arrival of the **VMWI**, the line will be periodically interrogated for the ON-HOOK condition and the delivery of the **VMWI** signal will commence 3 seconds after the terminal has gone ON-HOOK.

2.4 Notification OFF

Once all the voice messages have been delivered and the receiving terminal has returned ON-HOOK, the network will notify the receiving terminal of the absence of other messages. This is attained by repeating steps 2.1 to 2.3 with the **MWN** indication OFF.

3.0 PHYSICAL CHARACTERISTICS OF THE TERMINAL-TO-NETWORK INTERFACE

3.1 Data Interface

Parameters

Link Type	simplex, two wire
Transmission Scheme	analog, phase-coherent frequency shift keying
Logical 1 (Mark)	1200 ±12 Hz
Logical 0 (Space)	2200 ±22 Hz
Transmission Rate	1200 bits per second
Application of Data	serial, binary, asynchronous
Bit Error Rate	less than 1 out of every 100,000 bits at the switch interface
Phase Continuity	maintained from initial service to end of message
Transmission Level	-13.5 ± 1 dBm at the switch point of data application into a resistive load of 900 ohms. The loop loss is typically less than 10 dB.
Bit Duration	833 ±50 μsec (start and stop bits have same duration as a standard bit)

The requirements listed above are satisfied by a 202 type of modem transmission (Reference 8.5). The 900 1/2 load resistance value is a reference value. The actual resistance of the terminal may vary. The received level may be affected by the terminating impedance. That must, therefore, be considered in the design of the terminal. The terminal design shall adhere to requirements stated in Reference 8.4.

3.2 Timing Information

This section discusses the timing and tolerance requirements for the interface. These requirements apply only when the terminal is in the ON-HOOK state and the transmission path has been established from the IVMS to the terminal.

The timing requirements are summarized in Figure 1.

The channel seizure signal provides a detectable enabling function to the terminal. It consists of 30 continuous bytes of 01010101 (octal 125). This signal is followed by a carrier signal (a mark-logical 1).

The maximum interrupt time between any two successive bytes is equivalent to 20-bit time periods at 1200 bps (i.e., 16.7 ms). If this interrupt time is exceeded, the message should be considered to contain an error. The message will not be retransmitted and will be lost.

The mark signal (which is transmitted between the parameter data words) should be monitored for continuity. An interrupt of the mark signal of 0.008 sec or less should be ignored by the data receiver. An interrupt that exceeds 0.008 sec should cause the received data to be treated as erroneous. The message will not be retransmitted and will be lost.

4.0 TIMING AND TOLERANCES

The timing and tolerances are explained in the following Figure 1.

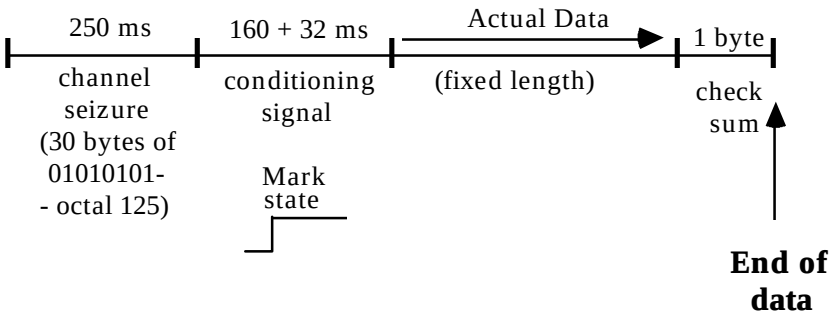

Figure 1: Timing Requirements

5.0 DETAILED DATA PROTOCOL

5.1 Characteristics

- The protocol uses 8-bit data words that are each bounded by a start bit (space) and a stop bit (mark). A combination of bytes is used to transmit a data message consisting of message type, message length, parameter message and error detection words. The message type, message length and error detection words each consist of a single eight bit byte. The parameter message consists of three one byte words, namely the parameter code, the parameter length and the message waiting status.

- The data is sent with the least significant bit (LSB) transmitted first.

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

5.2 Message Layout

The message layout is explained in the following Figure 2.

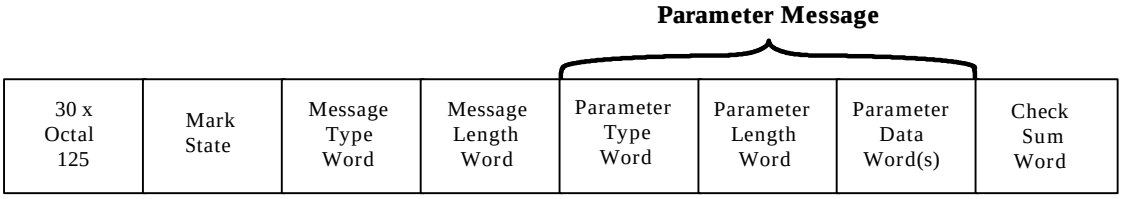

Figure 2: Message Layout

5.3 Parameter Message

Message Waiting Status

This parameter is used to indicate that the MWN should be either turned **ON** or turned **OFF**. The Parameter Message Waiting Status is explained in Figure 3.

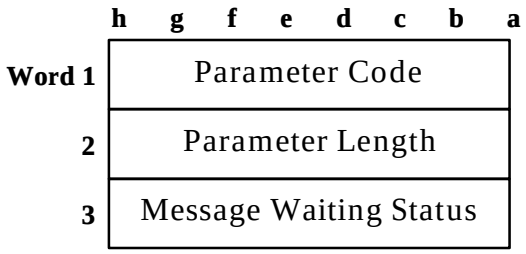

Figure 3: Parameter Message - Message Waiting Status

- bit "a" is the least significant bit and is transmitted first.
- the parameter code is 11 (00001011).
- the parameter length is always 1 (00000001).
- the Message Waiting Status is coded in binary as follows:

  Turn ON: 11111111
  Turn OFF: 00000000

Even though this parameter is defined for Message Waiting message type, it can be also used in conjunction with other message types (i.e., call set-up message). This allows the IVMS to send one message to update the display during call termination (Calling Number Delivery - Reference 8.1), and turn ON or OFF the **VMWI**.

5.4 Check Sum Word

The error detection Check Sum Word, included as the last word of the multiple data message, consists of the two's complement of the modulo 256 sum of the other words in the data message. Namely, the Message Type, Message Length, Parameter Type, Parameter Length and Parameter Data Word(s) of the complete message, excluding the Check Sum Word itself. The Check Sum Word applies to both the recognized and unrecognized words. The addition of the received Check Sum Word with the modulo 256 sum of all words received by the terminal in the message should equal to zero.

If an error is detected by the terminal, none of the received data should be displayed. The switch will not retransmit the message.

6.0 EXAMPLE

6.1 Message Waiting Indication ON

Message Type Word	10000010	Message Waiting Notification
Message Length Word	00000011	3
Parameter Type Word	00001011	Message Waiting Parameter
Parameter Length Word	00000001	1
Parameter Data Word	11111111	Message Waiting Status ON
Check Sum Word	01110000	2's complement modulo 256

6.2 Message Waiting Indication OFF

Message Type Word	10000010	Message Waiting Notification
Message Length Word	00000011	3
Parameter Type Word	00001011	Message Waiting Parameter
Parameter Length Word	00000001	1
Parameter Data Word	00000000	Message Waiting Status OFF
Check Sum Word	01101111	2's complement modulo 256

7.0 APPENDIX - Voice Message Retrieval

The messages can be retrieved from the user's mailbox by calling the **Directory Access Number/Code** given to users upon subscription to the service. When called, series of voice prompts guides the subscriber through the retrieval process.

8.0 REFERENCES

8.1 Bell Canada:

Interface Document ID-0001, November 1989, "Call Management Service (CMS) Terminal-to-Network Interface".

8.2 Bellcore:

TR-TSY-000030, Issue 1, November 1988, "SPCS Customer Premises Equipment Data Interface".

8.3 Bellcore:

TR-TSY-000031, Issue 2, June 1988, "CLASS Feature: Calling Number Delivery".

8.4 Department of Communications:

CS-03, "Terminal Equipment Certification Standard", Current Issue.

8.5 Data Set 202S and 202T Interface Specification:

Bell System Data Communications Technical Reference, Current Issue.