



Multimedia for Host Media Processing Demo

Demo Guide

September 2005



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Publication Date: September 2005

Document Number: 05-2456-001

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Revision History

This revision history summarizes the changes made in each published version of this document.

Document No.	Publication Date	Description of Revisions
05-2456-001	September 2005	Initial version of document.



About This Publication

This preface provides information about this document in the following sections:

- [Purpose](#)
- [Intended Audience](#)
- [How to Use This Publication](#)
- [Related Information](#)

Purpose

This guide tells you how to run the Multimedia demo that is provided with the Intel NetStructure® Host Media Processing (HMP) software. The guide describes the demo, lists its requirements, and provides details on how it works.

Intended Audience

This publication is intended for the following customer types:

- Distributors
- System Integrators
- Toolkit Developers
- Independent Software Vendors (ISVs)
- Value Added Resellers (VARs)
- Original Equipment Manufacturers (OEMs)

How to Use This Publication

Refer to this publication after you have installed the HMP software, which includes the Multimedia demo software. This publication assumes that you understand computer telephony terms and concepts, and that you are familiar with and have prior experience with the operating system and the C programming language.

The information in this guide is organized as follows:

- [Chapter 1, “Demo Description”](#) provides a brief overview of the Multimedia demo.
- [Chapter 2, “System Requirements”](#) discusses the requirements for running the demo.
- [Chapter 3, “Preparing to Run the Demo”](#) lists the tasks to perform before running the demo.

- [Chapter 4, “Running the Demo”](#) describes the steps required to run the demo, the demo options, the various modes of demo operation, and how to stop the demo.
- [Chapter 5, “Demo Details”](#) provides additional information about the demo, such as the files used by the demo.

This document also contains a [Glossary](#) and an [Index](#).

Related Information

Following is a list of information related to the Multimedia demo:

- *Intel NetStructure Host Media Processing Software Installation Guide* - This document describes how to install the required HMP software.
- *Intel NetStructure Host Media Processing Release Guide* - This document provides information about the HMP software such as product features, system requirements, and user documentation.
- *Intel NetStructure Host Media Processing Release Update* - This document addresses release issues such as known problems and documentation updates.
- *Multimedia API for Linux Programming Guide* - This document provides information about video technology and multimedia library features, as well as guidelines for building applications using the Multimedia API.
- *Multimedia API for Linux Library Reference* - This document provides reference information for all functions, parameters, data structures, values, events, and error codes in the Multimedia API.
- For technical support, go to <http://developer.intel.com/design/telecom/support/>.
- For information about Intel NetStructure Host Media Processing products, go to <http://www.intel.com/design/network/products/telecom/software/index.htm#hmp>
- For information about Intel® telecom products, go to <http://www.intel.com/design/network/products/telecom/index.htm>.

This chapter provides a description of the Multimedia demo.

The Multimedia demo application features the video capabilities of the Intel NetStructure® Host Media Processing (HMP) software. The application is based on the Global Call API for Session Initiation Protocol (SIP) call control and uses the IP Media Library (IPML) for Real-Time Transport Protocol (RTP) media manipulation, the Multimedia API for playing and recording audio/video streams, and DX for Dual-Tone Multi-Frequency (DTMF) detection and generation.

The multimedia demo application demonstrates two use cases:

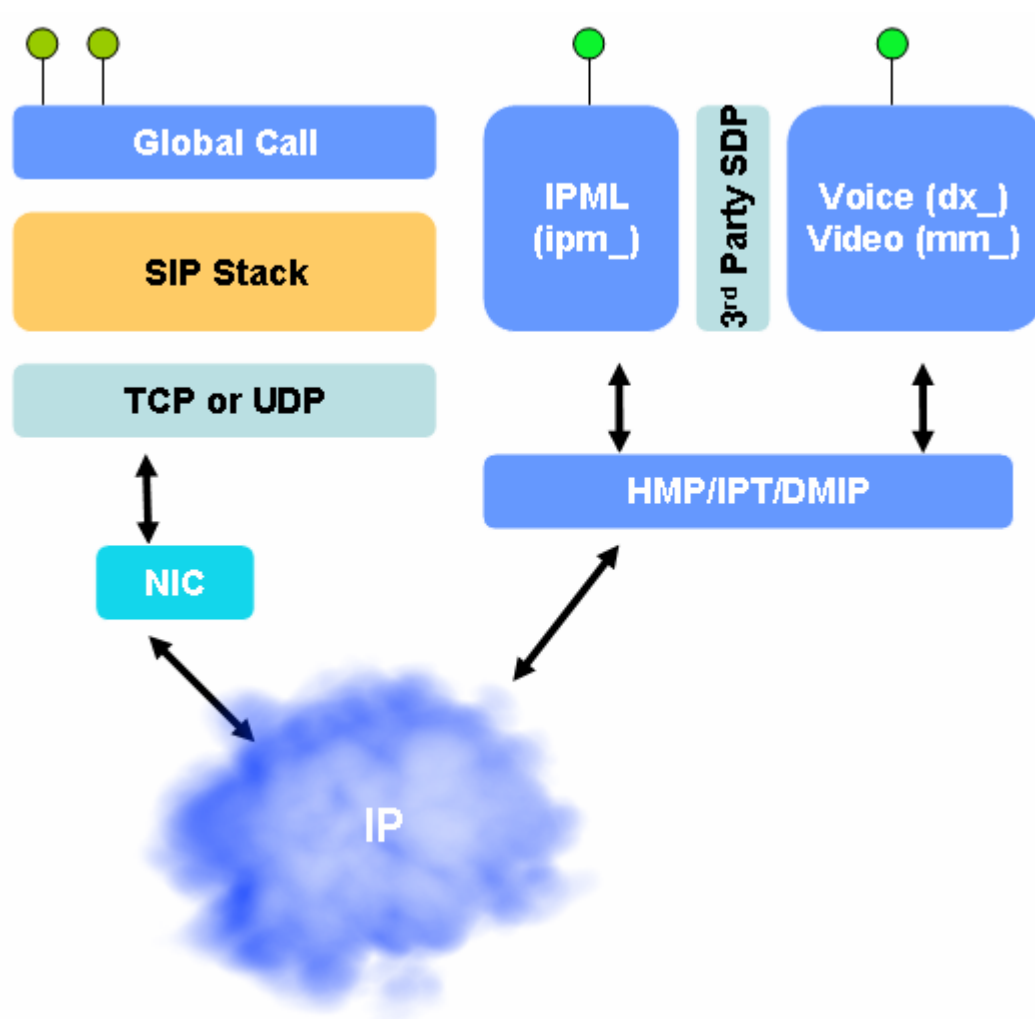
- Video mail – users can record an audio/video clip and play it back at a later time
- Video portal – users can select video clips from a menu

The key features of the Multimedia demo are as follows:

- Terminates an incoming SIP call and answers it
- Plays video clips (menus and/or short clips)
- Records an audio/video message to disk
- Detects inband and RFC 2833 DTMF digits in the RTP stream

Figure 1 shows the multimedia demo application's architecture.

Figure 1. Multimedia Demo Application Architecture



The multimedia demo application uses various APIs provided with the HMP software. The Global Call API and the SIP stack provide the necessary call control capability, while the IP Media Library (IPML), Voice (dx_), and Video (multimedia) libraries provide the control to manipulate the RTP streams and record and play back real-time voice and video data.

This chapter describes the hardware and software requirements that must be met before you can run the Multimedia demo.

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- [Software Requirements](#) 13

2.1 Hardware Requirements

For hardware requirements, refer to the Release Guide (or Release Notes) for the Intel NetStructure® Host Media Processing (HMP) software version you are using.

In addition to meeting the requirements in the HMP release documentation, you will need a video phone or a computer with soft video client software.

2.2 Software Requirements

To run the multimedia demo as documented in this guide, you need the following software:

- Intel NetStructure® Host Media Processing Software
- A SIP proxy server with which the demonstration program can register its details. Following are a few examples of SIP proxies:
 - SIP Express Router (SER) - <http://www.ipitel.org>
 - OnDo SIP Proxy from Brekeke - <http://www.brekeke.com> (free 30-day trial)
 - Interactive Intelligence SIP Proxy - <http://www.inin.com> (free 30-day trial)

Refer to the list of IP phones in the Release Guide.

For operating system requirements, see the release documentation (Release Guide or Release Notes) that accompanies your specific HMP release.



This chapter describes what you need to do before running the Multimedia demo.

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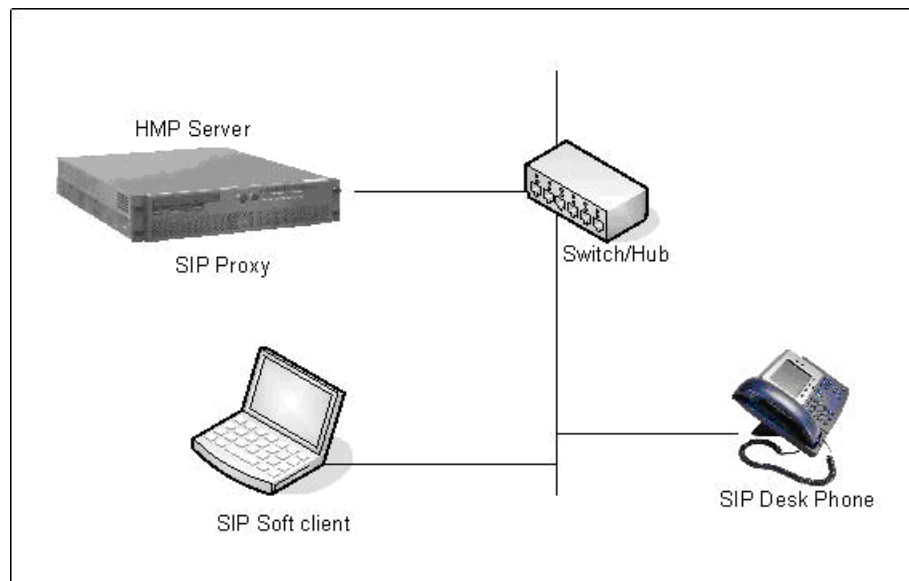
3.1 Connecting to External Equipment

This section describes the external connections required for the Multimedia demo.

The external video equipment used to call the multimedia demo must be ready while starting the demo. Follow the individual setup and configuration instructions for the video-capable IP endpoints you are using.

Figure 2 shows the network topology and connections that must be set up before you run the Multimedia Demo.

Figure 2. Network Connections



You can use either a separate SIP proxy server or the SIP proxy software can be run along with the HMP software. You will have to edit the *mmdemo.cfg* file accordingly as described in [Section 3.2, “Editing the Configuration File”](#), on page 16.

3.2 Editing the Configuration File

This section discusses how to configure the demo for your system. It contains the following topics:

- [Configuration File Location](#)
- [Editing the mmdemo.cfg Configuration File](#)

3.2.1 Configuration File Location

The demo runs with the help of the configuration file named *mmdemo.cfg*. This configuration file is essential for providing the program with required configuration information. Use a text editor and open the file from:

```
${INTEL_DIALOGIC_DIR}/demos/MultiMedia/MultiMediaDemo
```

3.2.2 Editing the mmdemo.cfg Configuration File

Before running the multimedia demo, modify the *mmdemo.cfg* file to reflect your system environment. You will need to specify the SIP proxy/registrar's IP address: `proxyip = x.x.x.x`

If the SIP proxy software is run along with the HMP software, the multimedia demo application (mmdemo) registers with the SIP proxy using a SIP signaling port number other than 5060, which is the default SIP port. You must specify this new port in the *mmdemo.cfg* file.

If a separate SIP proxy server is used, specify the IP address of that server in the *mmdemo.cfg* file and set `sipudpport` to 5060, which is the SIP default.

The configuration parameters populated through the *mmdemo.cfg* file are as follows:

numberofcalls

This parameter signifies the number of IP channels to be initialized and used while running the demo.

calltype

This parameter indicates the type of call control to be used: SIP or H.323.

traceflag

This is a Boolean variable that accepts a value of true or false. This parameter switches the tracing facility on or off. When enabled, a lot of information is printed to the screen. Tracing should be used only when the number of channels is limited (no more than one or two channels).

proxyip

The IP address of the server at which the demonstration program registers its information. This will be the IP address used by the Multimedia client to call into the demonstration program.

sipudpport

This is the SIP signaling port number. The default SIP port number is 5060.

PhoneNumber

This is the extension number used by the multimedia demo to register itself with the proxy server. This will also be the extension used by the Multimedia client to interact with the demo. The PhoneNumber = 2000 is the number that you would call to on the SIP video phone. This is the number that the HMP channel registers with the SIP proxy as the Uniform Resource Identifier (URI)¹.

Figure 3 shows a sample configuration file.

Figure 3. Sample Configuration File

```
#####
# This is a comment line
# NumberOfCalls - is the number of channels to use
# calltype      - is the protocol used - h323 or sip
# TraceFlag     - turns tracing on - extensive logging to screen.
#               Use only when running 1 or 2 channels.
# lowresvideo   - flag to indicate if Low Resolution video
#               menus/clips should be used by the demo application
#               true = menus/clips will be played at 64kbps QCIF 10fps
#               false = menus/clips will be played at 400kbps CIF 30fps
# proxyip       - is the IP address of the SIP proxy server
# sipudpport    - is the UDP port number to use - default is 5060 in SIP
# PhoneNumber   - is a unique phone number that every HMP channel
#               will use starting with this number
#               - incremented by 1
#####
numberofcalls = 1
calltype      = sip
traceflag     = false
lowresvideo   = true
proxyip       = 192.168.1.100
sipudpport    = 10000
PhoneNumber   = 2000
```

The flag “lowresvideo” indicates which type of video files to use. The application has two sets of files in the appropriate directories *lores* and *hires*. The low resolution audio/video files are QCIF, 64 Kbps, and 10 fps clips and the high resolution ones are CIF, 400 Kbps, and 30 fps files. If you are using a SIP soft video phone, you can use the high resolution files since most soft clients support that resolution.

3.3 Compiling and Linking

To compile the source code for the multimedia demo program, perform the following:

1. Go to this location:

```
 ${INTEL_DIALOGIC_DIR}/demos/MultiMedia/MultiMediaDemo
```

1. Uniform Resource Identifier is of the form sip:user:password@host:port;uri-parameters?headers.



2. At the command prompt, type

```
make
```

If you have added or changed files, perform the following to compile the project:

1. Put the files in

```
${INTEL_DIALOGIC_DIR}/demos/MultiMedia/MultiMediaDemo
```

2. Modify the Makefile to take into account the new files generated.

3. At the command prompt, type

```
make
```

Successful compilation results in an executable called *MultiMediaDemo* at the following location.

```
${INTEL_DIALOGIC_DIR}/demos/MultiMedia/MultiMediaDemo/Release
```

This chapter provides information about running the Multimedia demo.

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4.1 Starting the Demo

This section describes how to start the multimedia demo. Before running the demo, be sure to follow the instructions provided in [Chapter 3, “Preparing to Run the Demo”](#).

The Intel NetStructure[®] Host Media Processing (HMP) software is automatically started during system boot-up. The appropriate scripts have been invoked and the necessary services started. To start the multimedia demo, perform the following:

1. Launch a terminal window to start typing commands.
2. Change to the following directory:

```
${INTEL_DIALOGIC_DIR}/demos/MultiMedia/MultiMediaDemo/Release
```

3. At the command prompt, type

```
./MultiMediaDemo
```

The multimedia demo application will launch. Figure 4 shows sample output from the demo. To exit the demo, type **q** and press **Enter** and wait for a few seconds.

Figure 4. Sample Output from the Multimedia Demo

```

< Multimedia Demo Application >
-----
Successfully opened Config file "mmdemo.cfg" for reading

MMDemo Application will use IP: 192.168.1.100 for Call Control.
[Aug 18 09:42:46.768] [APP] [INFO] -> Starting GC ....
[Aug 18 09:42:48.196] [APP] [INFO] -> Collecting Device Information...
[Aug 18 09:42:48.570] [SIP] [INFO] -> Register()
[Aug 18 09:42:48.570] [SIP] [INFO] -> Register() Sending REGISTER to 192.168.1.100, with
10000@192.168.1.100
[Aug 18 09:42:48.633] [APP] [INFO] -> .....DONE!
[Aug 18 09:42:48.700] [APP] [INFO] -> Registration with SIP Proxy was Successful.
[Aug 18 09:42:48.701] [SIP] [INFO] -> gc_WaitCall complete
[Aug 18 09:42:48.801] [MMS] [INFO] -> localAudioPort = 49152, localVideoPort = 57344,
localIP = 192.168.1.100

[Aug 18 09:42:48.845] [MMS] [INFO] -> Vox channel dxxxBlCl listening to IPM Local TS=1
[Aug 18 09:42:52.895] [SIP] [INFO] -> ANI: 9003@192.168.1.100 DNIS: 1000@192.168.1.100
CRN: 0x8000001
[Aug 18 09:42:52.896] [SIP] [INFO] -> Incoming Call From = 9003@192.168.1.100
[Aug 18 09:42:52.960] [SIP] [INFO] -> Answered Incoming Call
[Aug 18 09:42:52.960] [MMS] [INFO] -> [ipmBlCl] DTMFs will be detected using RFC2833
[Aug 18 09:42:53.052] [MMS] [INFO] -> Audio IpAddress: 192.168.1.101 Audio RTP Port: 4000
[Aug 18 09:42:53.053] [MMS] [INFO] -> Video IpAddress: 192.168.1.101 Video RTP Port: 4002
[Aug 18 09:42:55.306] [MMS] [INFO] -> Got DTMF Digit -> Playing Video Portal Menu..
[Aug 18 09:43:03.010] [MMS] [INFO] -> Got DTMF Digit -> Play Clip 1
[Aug 18 09:43:28.306] [MMS] [INFO] -> Got DTMF Digit -> Play Clip 2
[Aug 18 09:43:52.882] [MMS] [INFO] -> Got DTMF Digit -> Play Clip 3
[Aug 18 09:44:08.254] [MMS] [INFO] -> Got DTMF Digit -> Playing Main Menu
[Aug 18 09:44:12.324] [MMS] [INFO] -> Got DTMF Digit -> Playing Video Mail Menu
[Aug 18 09:44:17.602] [MMS] [INFO] -> Got DTMF Digit -> Start Recording..
[Aug 18 09:44:17.602] [MMS] [INFO] -> Recording -> Sending SIP INFO to request I-Frame
[Aug 18 09:44:17.666] [MMS] [INFO] -> Recording to audio/video file
[Aug 18 09:44:17.939] [MMS] [INFO] -> Got I-Frame in video stream
[Aug 18 09:44:24.862] [MMS] [INFO] -> Got DTMF Digit -> Stop Recording
[Aug 18 09:44:26.950] [MMS] [INFO] -> Got DTMF Digit -> Start Playing audio/video file
[Aug 18 09:44:36.331] [SIP] [INFO] -> [:N_ipmBlCl:P_SIP] mmDropCall() Dropping call
[Aug 18 09:44:36.332] [MMS] [INFO] -> [ipmBlCl] Stopping RTP Streaming ipm_Stop
q
[Aug 18 09:44:46.467] [APP] [INFO] -> RunDemo() Exiting....
[Aug 18 09:44:46.467] [APP] [INFO] -> Shutting down .....
[Aug 18 09:44:46.467] [SIP] [INFO] -> DeRegister()
[Aug 18 09:44:46.532] [SIP] [INFO] -> gc_ResetLineDev complete
[Aug 18 09:44:49.162] [APP] [INFO] -> ..... gc_Stop() done!

```

4.2 Demo Options

The multimedia demo does not support any command line switches. All configuration information is controlled through the configuration file.

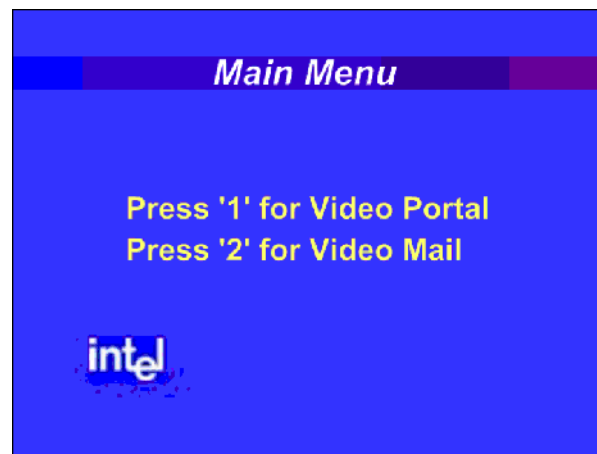
4.3 Using the Demo

This section describes how to use the multimedia demo.

Start the demo as described in [Section 4.1, “Starting the Demo”](#), on page 19.

With the help of the information you provided by editing the configuration file (as described in [Chapter 3, “Preparing to Run the Demo”](#)), the multimedia demo program registers with the Proxy Server and waits for input from you. Once the demo is ready, use the SIP video phone or soft client to dial **2000**, which is the number used by the multimedia demo application when registering with the SIP proxy. The multimedia demo program features two applications: video portal and video mail. These two applications are selected via DTMF input from a SIP phone. When the HMP server running `MultimediaDemo` receives a SIP call, a menu is displayed that allows you to select between video portal and video mail as shown in Figure 5.

Figure 5. Multimedia Demo Main Menu



If you press **1** on the phone, the Video Portal Menu appears (Figure 6). This menu allows you to select between three video clips. To go back to the main menu (Figure 5), press **#**. To exit the demo, hang up.

Figure 6. Video Portal Menu



When you press **2** at the main menu (Figure 5), the Video Mail Menu appears (see Figure 7). This menu allows you to select between Start Recording, Stop Recording, and Play Message (the

message you recorded). So by pressing 1, 2, and 3 on the phone (as indicated on the menu) you can start and stop recording and play and replay a message and perform these actions multiple times all in a single call. You do not have to hang up between actions.

Press # to go back to the main menu. To exit the demo, hang up.

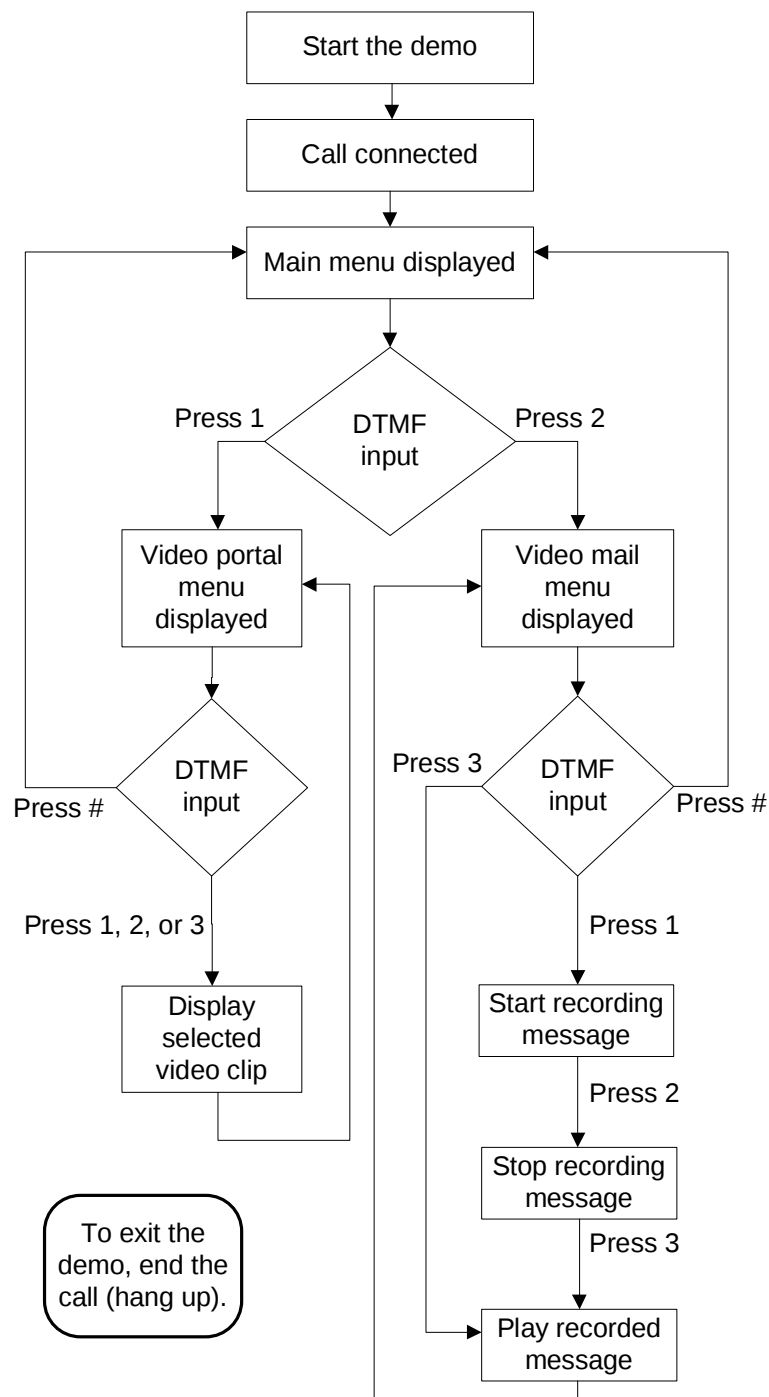
Note: The multimedia demo program only saves the previously recorded message. It can be retrieved at any time until a new message is recorded.

Figure 7. Video Mail Menu



The flow diagram in Figure 8 illustrates how the demo works.

Figure 8. Flow Diagram for Multimedia Demo



4.4 Stopping the Demo

To exit the multimedia demo during a call, simply hang up.

To exit the multimedia demo from the computer, type **q** and press **Enter** to quit. Wait for the demo to shut down. It takes about three to five seconds. To exit the demo abruptly, press **CTRL-C** twice. If you do this, you will need to restart the HMP system by executing `dlstop` and then `dlstart`. For more information about running HMP, refer to the HMP Administration Guide.

This chapter lists the files used by the multimedia demo.

The multimedia demo files listed in Table 1 are located in the following directory:

```
${INTEL_DIALOGIC_DIR}/demos/MultiMedia/MultiMediaDemo
```

Table 1. Files in the MultiMediaDemo Directory

Filename	Purpose
config.cpp	Implementation file for configuration routines, parsing .cfg file
config.h	Header file for configuration routines
connection.h	Header file that defines a connection
exitsync.h	Header file for operating system primitives for thread synchronization
exitsync.cpp	Implementation file for operating system primitives for thread synchronization
ipchannel.cpp	Implementation file for Global Call SIP call control
ipchannel.h	Header file for Global Call SIP call control
locker.h	Header file for operating system primitives – mutex
makefile	Makefile to build the executable (Linux only)
miscellaneous.h	Header file that includes all other required header files
mmdemo.cpp	Implementation file for initialization routines
mmdemo.h	Header file that defines initialization routines
mmstream.cpp	Implementation file for state machine for IPML, DX, and MM devices
mmstream.h	Header file for state machine for IPML, DX and MM devices
MultiMediaDemo_version.cpp	Contains the version number identification for the multimedia demo program

The multimedia demo files listed in Table 2 are located in the following directory:

```
${INTEL_DIALOGIC_DIR}/demos/MultiMedia/MultiMediaDemo/Release
```

Table 2. Files in the Release Directory

Filename	Purpose
mmdemo.cfg	Configuration file to specify runtime parameters
MultiMediaDemo	Executable for the demo
sdpformat.txt	Text file that contains the SDP format to be used by the demo
mmdemo.log	Log file for the demo

The multimedia demo files listed in Table 3 are located in the following directory:

`${INTEL_DIALOGIC_DIR}/demos/MultiMedia/MultiMediaDemo/avfiles`

Table 3. Audio/Video Files (lores or hires) in the avfiles Directory

Filename	Purpose
Clip1.pcm[.vid]	Audio and video files for Clip 1
Clip2.pcm[.vid]	Audio and video files for Clip 2
Clip3.pcm[.vid]	Audio and video files for Clip 3
Main_menu.pcm [.vid]	Audio and video files for the Main Menu
Vmail_menu.pcm [.vid]	Audio and video files for the Video Mail Menu
Vportal_menu.pcm [.vid]	Audio and video files for the Video Portal Menu



Glossary

CIF: See Common Intermediate Format.

Codec: See COder/DECoder.

COder/DECoder: A device or program that can transform a data stream or signal.

Common Intermediate Format (CIF): A standard size for images produced by digital and video cameras. CIF images are 352 pixels wide and 288 pixels tall (352 x 288).

Computer Telephony (CT): Adding computer intelligence to the making, receiving, and managing of telephone calls.

CT: See Computer Telephony.

DTMF: See Dual-Tone Multi-Frequency.

Dual-Tone Multi-Frequency: A way of signaling consisting of a push-button or touch-tone dial that sends out a sound consisting of two discrete tones that are picked up and interpreted by telephone switches (either PBXs or central offices).

Gatekeeper: An H.323 entity on the Internet that provides address translation and control access to the network for H.323 Terminals and Gateways. The Gatekeeper may also provide other services to the H.323 terminals and Gateways, such as bandwidth management and locating Gateways.

Gateway: A device that converts data into the IP protocol. It often refers to a voice-to-IP device that converts an analog voice stream, or a digitized version of the voice, into IP packets.

Global Call: A unified, high-level API that shields developers from the low-level signaling protocol details that differ in countries around the world. Allows the same application to easily work on multiple signaling systems worldwide (for example, ISDN, T1 robbed bit, R2/MF, pulsed, SS7, IP, H.323).

H.323: A set of International Telecommunication Union (ITU) standards that define a framework for the transmission of real-time voice communications through Internet protocol (IP)-based packet-switched networks. The H.323 standards define a gateway and a gatekeeper for customers who need their existing IP networks to support voice communications.

International Telecommunication Union (ITU): An organization established by the United Nations to set telecommunications standards, allocate frequencies to various uses, and hold trade shows every four years.

Internet: An inter-network of networks interconnected by bridges or routers. LANs described in H.323 may be considered part of such inter-networks.

Internet Protocol (IP): The network layer protocol of the transmission control protocol/Internet protocol (TCP/IP) suite. Defined in STD 5, Request for Comments (RFC) 791. It is a connectionless, best-effort packet switching protocol.

IP: See Internet Protocol.

ITU: See International Telecommunication Union.

Network Interface Card: Adapter card inserted into a computer that contains necessary software and electronics to enable a station to communicate over network.

NIC: See Network Interface Card.

PSTN: See Public Switched Telephone Network.

Public Switched Telephone Network: The telecommunications network commonly accessed by standard telephones, key systems, Private Branch Exchange (PBX) trunks, and data equipment.

QCIF: See Quarter CIF.

QoS: See Quality of Service.

Quality of Service: A measure of the telephone service quality provided to the subscriber.

Quarter CIF (QCIF): This is a variation of CIF (see Common Intermediate Format). A standard size for images produced by digital and video cameras. QCIF images are 176 pixels wide and 144 pixels tall (176 x 144).

Real-time Transport Protocol (RTP): Defines a standardized packet format for delivering audio and video over the Internet.

RTP: See Real-time Transport Protocol.

SDP: Session Description Protocol

SIP: Session Initiation Protocol: an Internet standard specified by the Internet Engineering Task Force (IETF) in RFC 3261. SIP is used to initiate, manage, and terminate interactive sessions between one or more users on the Internet.

Standard Runtime Library (SRL): An Intel® Dialogic® library that contains C functions common to all Intel® Dialogic® devices, a data structure to support application development, and a common interface for event handling.

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