



# Dialogic<sup>®</sup> 3G-324M Multimedia Gateway

**Demo Guide**

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*June 2008*

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# ***Revision History***

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

<b>Document No.</b>	<b>Publication Date</b>	<b>Description of Revisions</b>
05-2643-001	June 2008	Initial version of document

# About this Publication

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

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

## Purpose

This guide describes how to run the Dialogic® 3G-324M Multimedia Gateway demo (also referred to as the 3G-324M Demo), for those who choose to do so. The guide describes the demo, lists its requirements, and provides details on how it works.

## Applicability

This document version (05-2643-001) is published for Dialogic® Multimedia Software for AdvancedTCA (MMP Software for ATCA) Releases 1.1 and 2.0, Dialogic® Host Media Processing Software Release 3.1LIN (Dialogic® HMP Software), and Dialogic® Multimedia Kit Software Release 1.0 for PCIe (MMK for PCIe).

This document may also be applicable to later software releases (including service updates). Check the Release Guide for your software release to determine whether this document is supported.

## Intended Audience

This publication is intended for the following customer types:

- System Integrators
- 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 Dialogic® software, which includes the 3G-324M 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 Dialogic® 3G-324M Multimedia Gateway 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, [Compiling and Linking](#), describes the steps required to compile the source code for the demo.
- Chapter 5, [Running the Demo](#), describes the steps required to run and to stop the demo, and shows a sample output.

## Related Information

For information on the Dialogic® 3G-324M software, see the Dialogic® 3G-324M API Library Reference.

See the following for additional information:

- For Dialogic® product documentation, see <http://www.dialogic.com/manuals>
- For Dialogic technical support, see <http://www.dialogic.com/support/>
- For Dialogic® product information, see <http://www.dialogic.com>

# 1 Demo Description

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This chapter provides a description of the Dialogic® 3G-324M Multimedia Gateway Demo. The following topics are covered:

- Overview
- SIP Endpoints and the Gateway
- 3G-SIP Loopback Scenarios
- 3G-MM Scenarios
- 3G Hairpinned Scenarios
- Nb UP Scenarios

## 1.1 Overview

The Dialogic 3G-324M Multimedia Gateway Demo (also referred to as the 3G-324M Demo) is a 3G to SIP gateway application which, on one side, demonstrates 3G mobile connectivity to a remote 3G-324M endpoint using the Dialogic® 3G-324M API library. The other side of the 3G-324M gateway application bridges the call to a local SIP endpoint or multimedia (audio and video) endpoint. In addition, a hairpinned 3G-3G call may also be demonstrated, where, an inbound 3G call is connected to a pair of interconnected 3G endpoints, and an outbound 3G connection is established.

The 3G-324M Demo is fully bi-directional. This means that it will accept an incoming call from either the 3G or SIP side, and attempt an outgoing call using the opposite technology. On successful completion of both call legs, audio and video are routed together until either leg is terminated.

Its bi-directionality makes it suitable for a range of different loopback tests. This means that it is possible to exercise the 3G-324M capabilities of a platform without a 3G connection or 3G test utility. This can be important in verifying system operation and for learning the Dialogic 3G-324M API.

The 3G-324M Demo features the 3G-324M protocol library connectivity software. When used, the demo provides 3G audio and video connectivity to a remote 3G mobile network. All platforms use the Linux operating system. Note that all features described in this document are not supported on every platform. Please see the specific product Release Guide for more information about supported features.

The application is primarily based on the following Dialogic® APIs:

- Dialogic® 3G-324M API for 3G connectivity
- Dialogic® Global Call API for PSTN network interface connection

- Dialogic® Global Call API for Session Initiation Protocol (SIP) call control
- Dialogic® IP Media Library (IPML) API for Real-Time Transport Protocol (RTP) media manipulation.
- Dialogic® Multimedia API for Play/Record of Multimedia files

The features of the 3G-324M Demo include:

- Using a Global Call PSTN network device for an E1 or T1 clear channel, SS7 or external connection. Direct SS7 and ISDN network connections are supported on Dialogic HMP Software and MMK for PCIe only
- Establishing a H.223 data call session
- Multiplexing/De-Multiplexing 3G-324M audio/video data
- Handling inbound/outbound SIP calls
- Bridging 3G calls to SIP calls
- Passing full-duplex audio/video data between a 3G mobile endpoint and a SIP endpoint
- Detecting and forwarding RFC2833 DTMF digits between endpoints
- Connecting an inbound 3G call to a Multimedia endpoint to play or record an audio/video file
- Connecting an inbound 3G call to a pair of 3G endpoints and hairpinning the call back out to an external 3G connection
- Demonstrating the use of the Nb User Plane (Nb UP) protocol for transporting the 3G data over IP
- Receiving a remote UDP socket indication of a PSTN call (optional)

## 1.2 SIP Endpoints and the Gateway

The audio and video codecs most commonly used with the 3G-324M protocol are the Adaptive Multi-Rate Narrow Band codec (AMR-NB) for audio and H.263 for video. The common demo configuration, supported on all platforms uses H.263 and AMR codecs "Natively", passing audio and video data without transcoding. A SIP video and audio transcode mode (XCDRMODE) is supported on MMP Software for ATCA 2.0 and MMK for PCIe Advanced video platforms only. In this case, IP codecs supported include MPEG4 or H.263 for video and AMR-NB, G.711 mu-law, G.711 A-law or G.723 for audio. However, since the default demo configuration supported on all platforms does not do any transcoding, the demo normally requires a SIP phone that supports the H.263 and AMR-NB codecs.

One such phone is the Kapanga video softphone, available from <http://www.kapanga.net/ip/home.cfm>.

It can be set up to use the default H.263 and AMR-NB codecs. Instructions for configuring the phone can be found in the Appendix, **Using the Kapanga SIP Softphone with the Dialogic® 3G-324M Multimedia Gateway Demo**.

*A note on using the Kapanga phone:* It is possible to limit the total bandwidth of audio/video sent by the phone so that it does not produce a video rate higher than 35 Kbps. This is necessary, as a single DS0 (64 Kbps) is the total bandwidth available for a 3G call. However, the Kapanga phone video bitrate limitation is an average bitrate setting. This may cause the video data rate to peak beyond the 64 Kbps limit of the 3G-324M data pipe. The issue may manifest as a video delay through the system or dropped video or audio data. In any event, media quality on the Dialogic HMP Software system, MMK Software for ATCA system, or MMK Software for PCIe system should not be judged by using the Kapanga phone alone, as it is not a true 3G-324M endpoint connection.

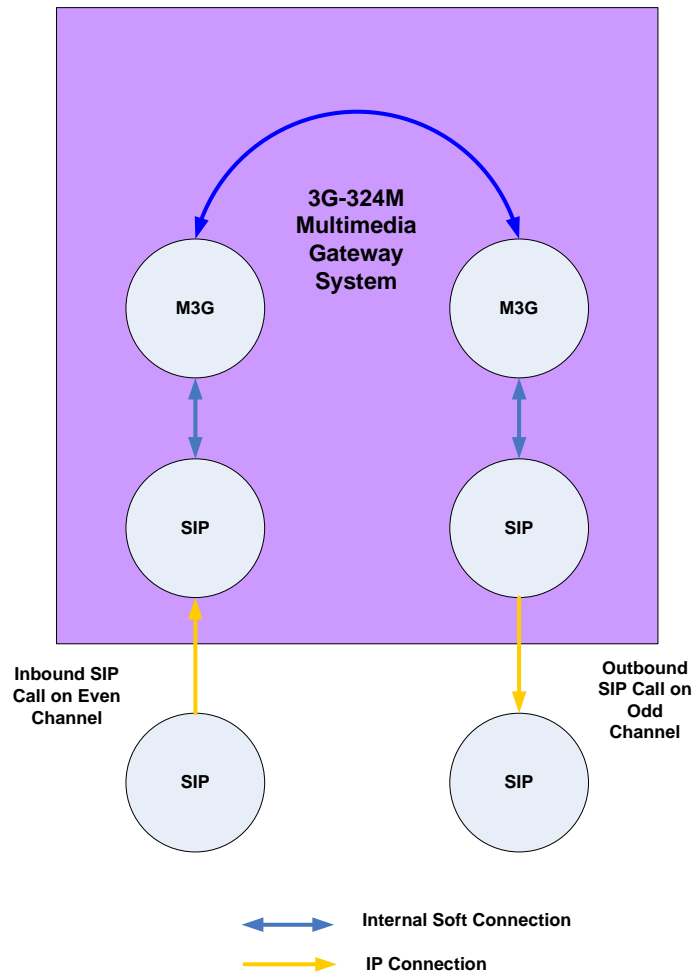
Another possibility for non-interactive testing is using the SIPp test utility. It can be found at <http://sipp.sourceforge.net/> and is an open-source project that may be used as a SIP endpoint either in the client or server mode. It is driven by an XML scenario script that can be set up to negotiate any audio or video codec, including AMR and H.263. Media is provided by a recorded packet capture (PCAP) file of an RTP stream of each of these two media types. Combining the XML script and media files results in a set of full SIP calls, with media streams. It is not possible to interactively view the video or hear the audio; however, the gateway itself operates the same as when interactive SIP endpoints are used. References to scripts and media files to drive SIPp can be found in the Appendix, **Using SIPp with the Dialogic® 3G-324M Multimedia Gateway Demo**.

Finally, the 3G-324M Gateway can be used in conjunction with the Dialogic® Multimedia demo to demonstrate video mail and video portal capabilities to a 3G mobile user. The Dialogic Multimedia demo can be used on the same system as the 3G-324M Gateway application, or on a separate system. The Dialogic Multimedia demo can be configured to use AMR-NB for audio. It demonstrates two use cases:

- 3G video mail/video blog – a 3G mobile device can record an audio/video clip and play it back at a later time.
- 3G video portal – a 3G mobile device can select video clips from a menu and stream to the 3G mobile device

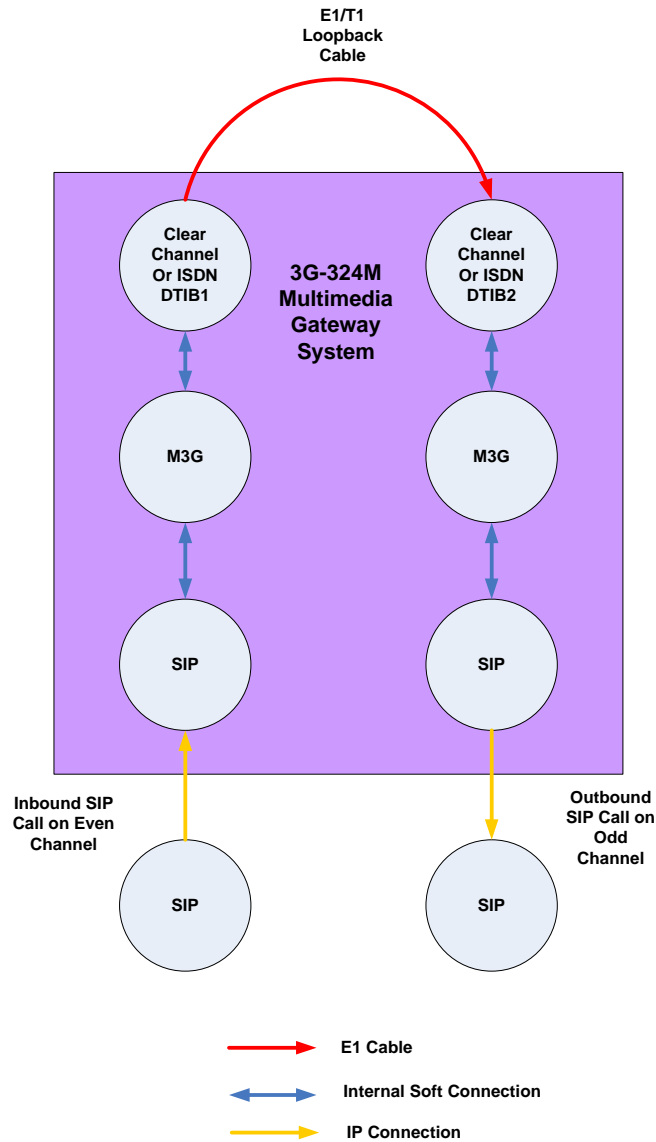
### 1.3 3G-SIP Loopback Scenarios

In many environments, a 3G network connection or 3G simulator is not available for running the demo. In this case, several different loopback scenarios, where an outbound 3G channel is connected to an inbound channel, are possible. Note that not every possible scenario is shown here.



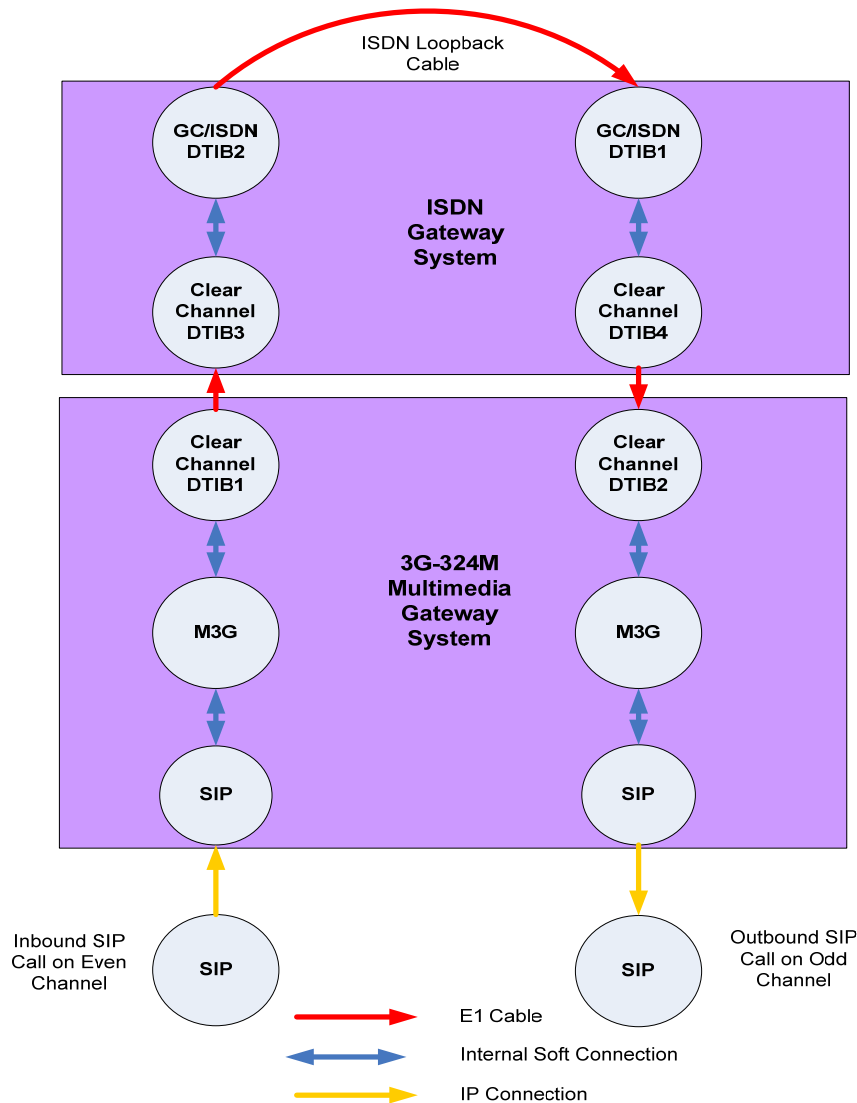
**Figure 1. 3G Internal Loopback**

In this scenario, two 3G devices (called M3G) created and controlled by Dialogic 3G-324M API library calls are connected via software to one another. DS0 channels on a PSTN board are not used. One 3G channel communicates directly with the other.



**Figure 2. 3G External Loopback**

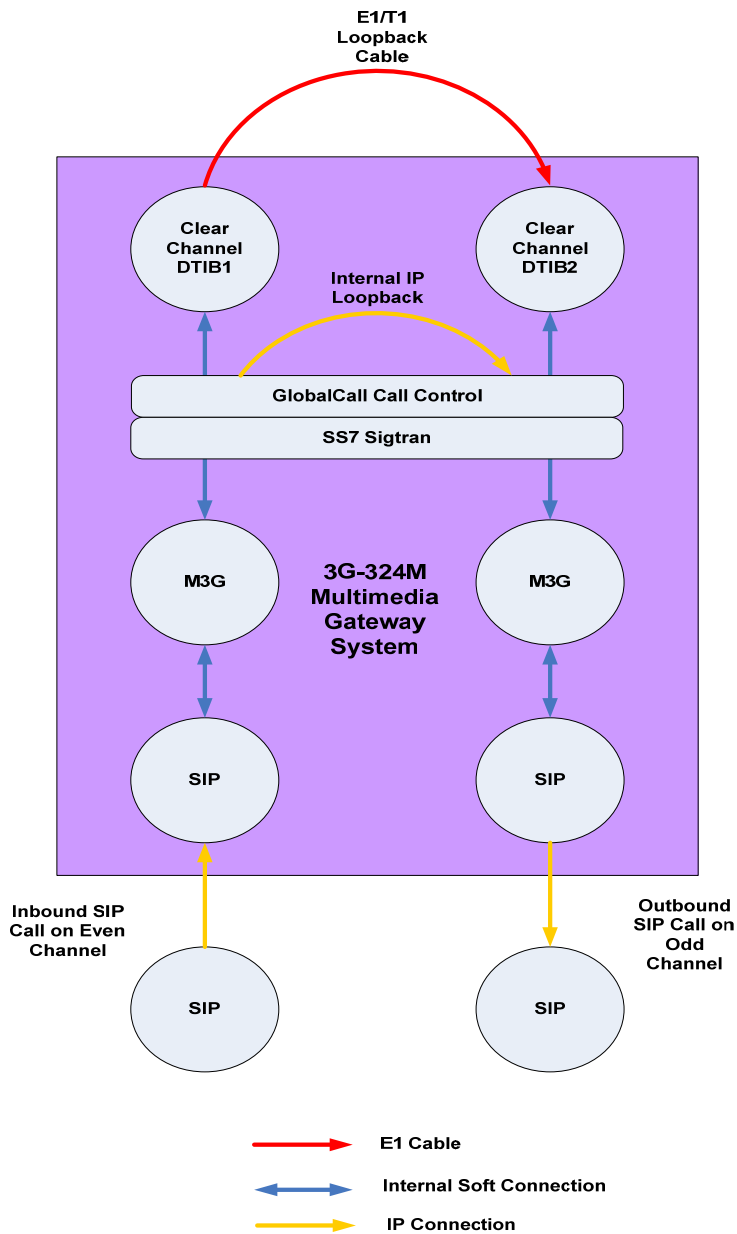
In this scenario, two 3G devices (called M3G) created and controlled by Dialogic 3G-324M API library calls are connected to DS0 timeslots on two different E1 spans on a PSTN board. The two spans are physically connected by a crossover cable, allowing the 30 channels on one span to communicate with the corresponding channels on the other span.



**Figure 3. ISDN Gateway Loopback**

As in 3G external loopback, two 3G devices (called M3G) created and controlled by Dialogic 3G-324M API library calls are connected to DS0 timeslots on two different E1 spans on a PSTN board. The two spans are physically connected to a second system. This system may act as a signaling gateway to a 3G network or, in this case, may loop back one channel to another and provide a 3G pathway independent of the system running the 3G-324M gateway. This separate ISDN signaling gateway is only needed on the Dialogic® Multimedia Platform for AdvancedTCA, which does not currently support ISDN signaling. Instructions for building an ISDN signaling gateway can be found in the Appendix, **ISDN to ClearChannel Gateway**.

These scenarios require different endpoint configuration, as will be covered in the section Endpoint Configuration.



**Figure 4. SS7 Loopback**

In this scenario, SS7/Sigtran is used for signaling to set up the 3G call. This scenario is similar to the external loopback. Two 3G devices created and controlled by 3G-324M API library calls are connected to clear channel DS0 timeslots on two different E1 spans on a PSTN board. The two spans are physically connected by a crossover cable. The difference here is that the signaling for the outbound and inbound calls is done using SS7/Sigtran.

SS7 signaling between endpoints is carried via IP. Once the calls are connected, 3G negotiations over the clear channel connections can then take place.

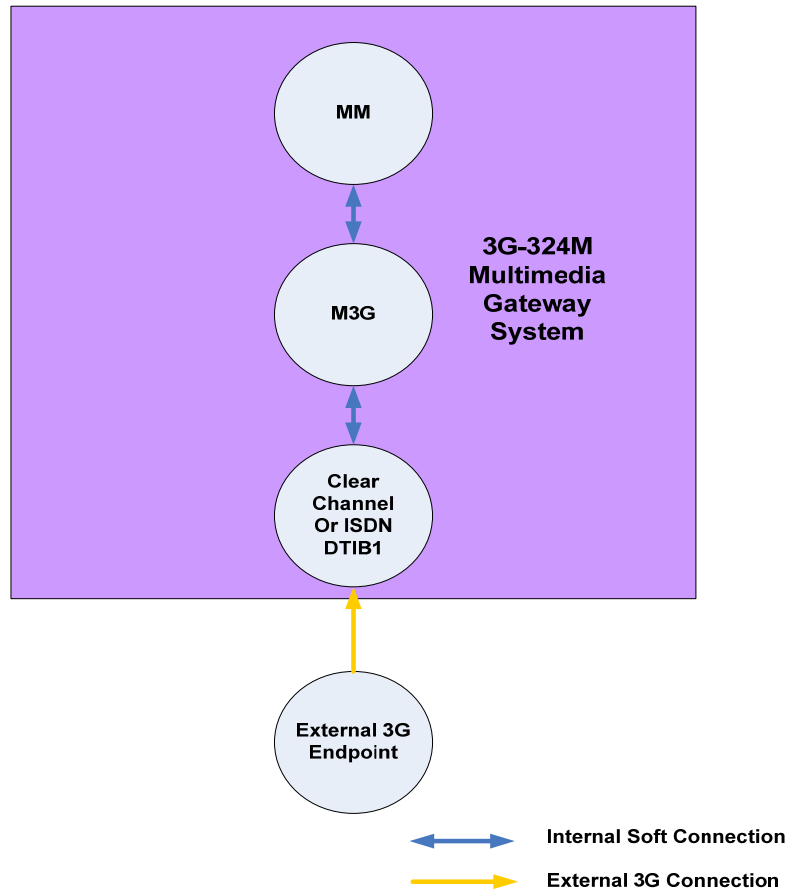
This scenario requires a working SS7/Sigtran/GlobalCall installation on the 3G-324M Gateway system. Setting this up is beyond the scope of this document. Refer to the application note “Configuring an SS7/Sigtran Demo System on Host Media Processing 3.1LIN” for instructions on downloading the SS7 software and configuring the system.

## 1.4 3G-MM Scenarios

In addition to connecting a 3G to a SIP endpoint, it is also possible to pair a 3G endpoint (called M3G) with a multimedia endpoint (called MM). In this case, the 3G endpoint has a “Native” (non-transcoded) AMR port connection to the multimedia endpoint, and a pair of AMR/H.263 files are played or recorded when the call is terminated at the multimedia endpoint. The media is stopped and the call is disconnected when:

- The play is finished
- A DTMF/UII is detected to stop the play or record
- The caller hangs up

Note that only a single operation is permitted with each call.



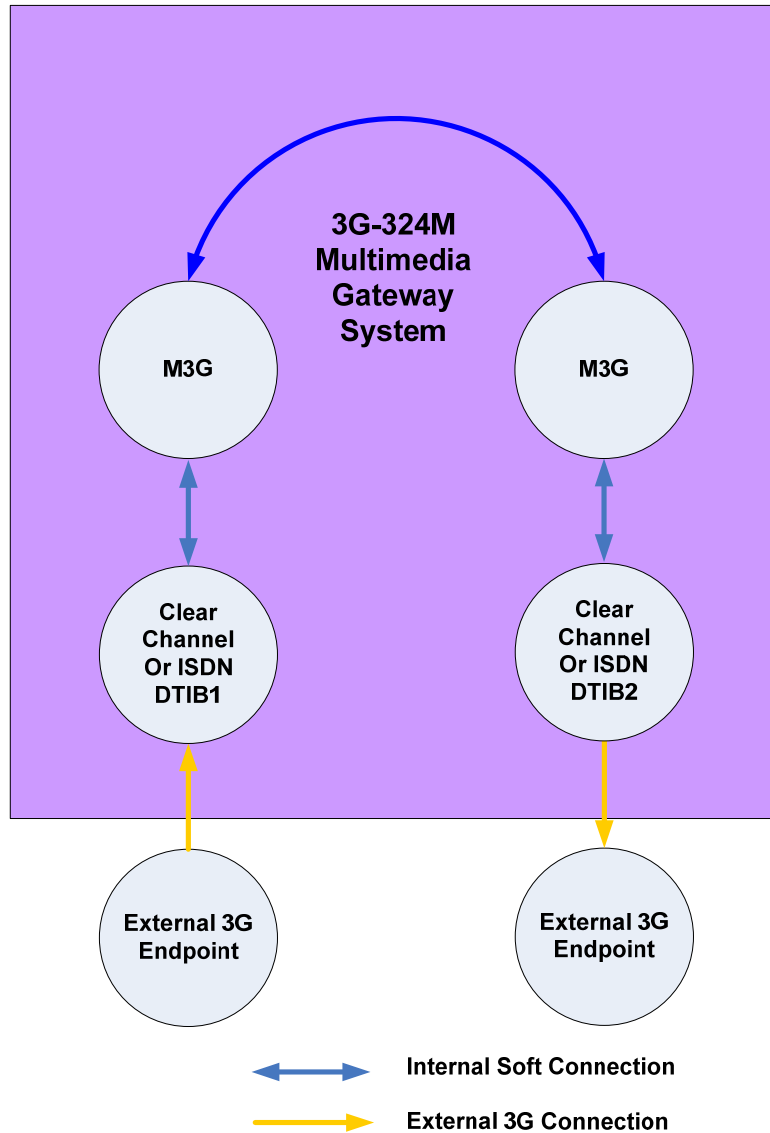
**Figure 5. 3G to MM Connection**

It is also possible to combine this scenario with an inbound SIP-3G endpoint pair using either an internal or external loopback. This allows a SIP phone to be used to demonstrate a 3G call working with a multimedia endpoint.

## 1.5 3G Hairpinned Scenarios

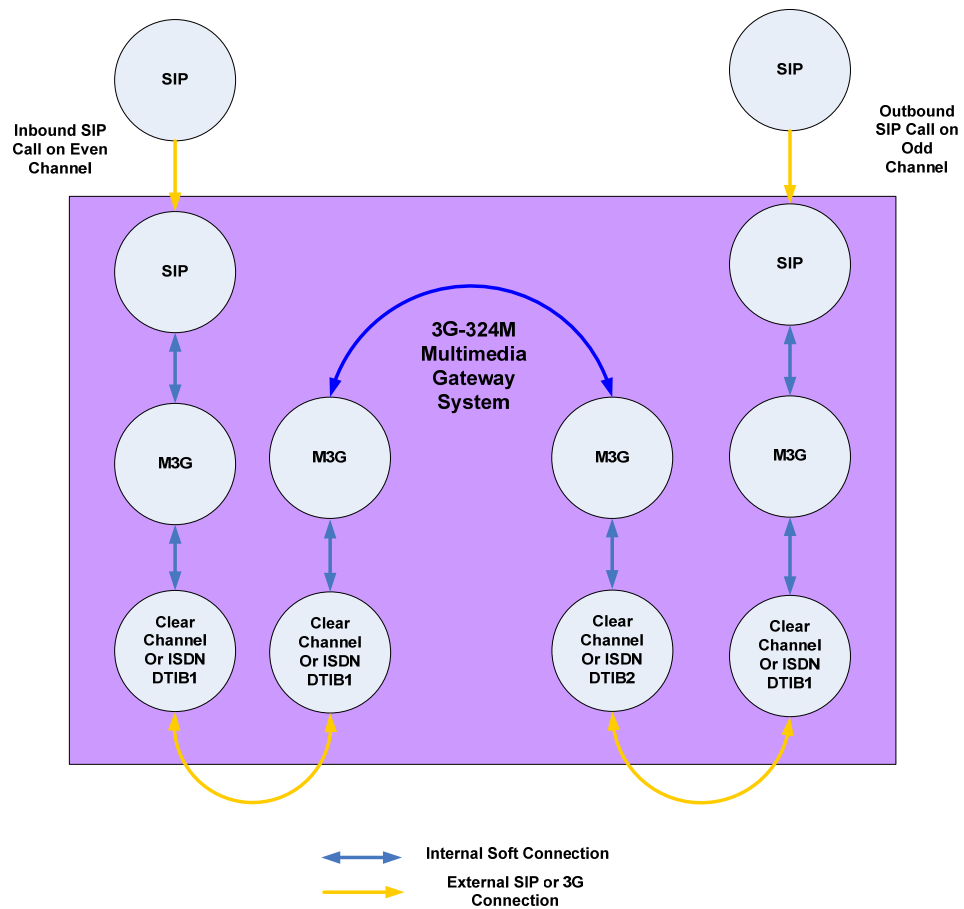
A 3G endpoint (called M3G) may also be paired with another 3G endpoint to form a hairpinned 3G connection. Here, all A/V media streams are passed through the 3G endpoint pair. This simulates the end result of a 3G supervised call transfer scenario. For example, an inbound 3G call may already be held on the platform engaged in a multimedia play. The application then decides to hold the caller while an outbound 3G call is made. When the outbound call is ready, the inbound 3G is connected to the outbound 3G.

Although the gateway does not demonstrate the interconnection changes, it does show the result in this 3G hairpinned scenario. More simply, a 3G-3G pair is configured, and an inbound 3G call triggers an outbound 3G call. On completion, an A/V path is established between the two external 3G endpoints.



**Figure 6. 3G Hairpinned Connection**

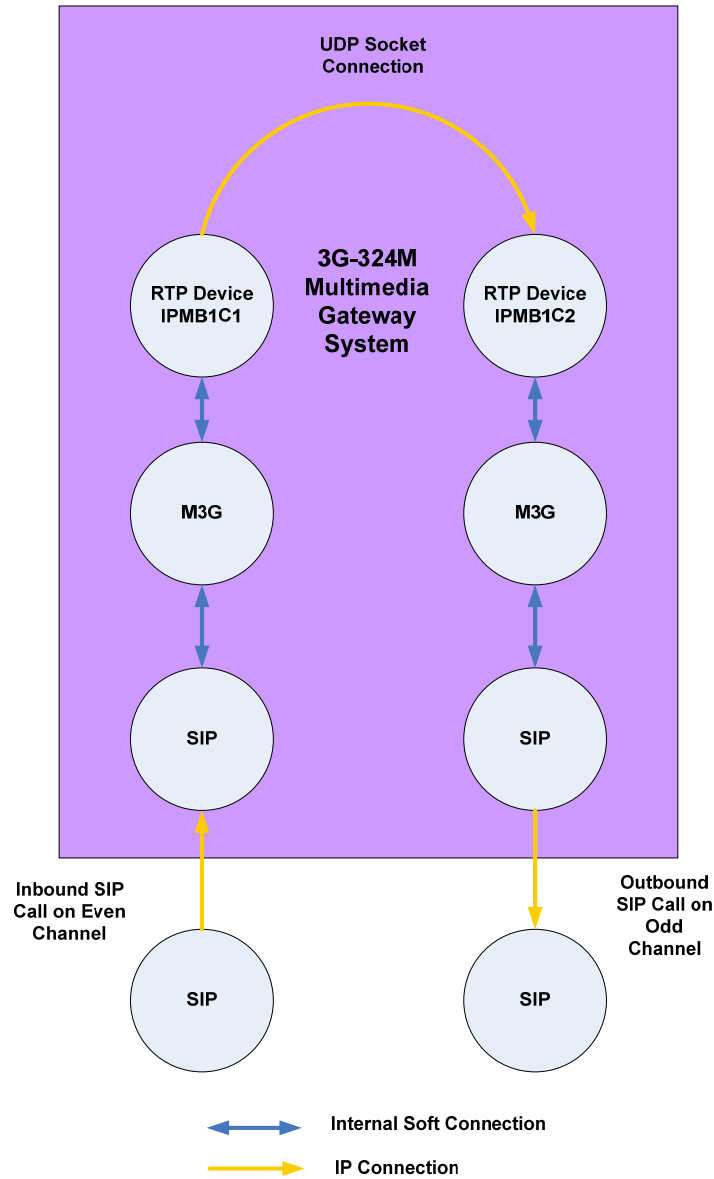
It is also possible to combine this scenario with two SIP-3G endpoint pairs to demonstrate a complete call path without a 3G connection or simulator. Here, external loopback connections are needed. A SIP phone places a call to a SIP-3G pair. The 3G goes out through an external loopback to the 3G-3G hairpin. The outbound 3G call then goes again through the external loopback and into a second 3G-SIP pair. This results in an outbound SIP call to a second external SIP phone. The result is the two SIP phones are interconnected through the 3G-3G hairpin on the gateway.



**Figure 7. 3G Hairpinned Connection with SIP Inbound/Outbound**

## 1.6 Nb UP Scenarios

The 3G-324M Demo may also be configured to use Nb UP. It converts the 3G data that normally travels over a TDM E1/T1 line to an RTP packet stream that may be sent over an IP connection. Most of the loopback scenarios described above can use an Nb UP connection. Here is an example of a pair of external SIP endpoints connected through the gateway using Nb UP as the 3G transport:



**Figure 8. Nb UP connection**

The UDP socket connection uses two different ports on the same system to pass RTP/Nb UP data. If two separate systems contained the 3G endpoints, some method of coordinating the Nb UP connection on either side would be needed. Bearer Independent Call Control (BICC) would likely be used. The gateway does not do this.

## 2 System Requirements

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This chapter describes the hardware and software requirements that must be met before you can run the Dialogic® 3G-324M Multimedia Gateway Demo:

- [Dialogic® Multimedia Platform \(MMP\) for AdvancedTCA \(ATCA\) Hardware/Software Requirements](#)
- [Dialogic® Host Media Processing \(HMP\) Hardware/Software Requirements](#)
- [Dialogic® Multimedia Kit \(MMK\) for PCIe Hardware/Software Requirements](#)

### 2.1 Dialogic® Multimedia Platform (MMP) for AdvancedTCA (ATCA) Hardware/Software Requirements

For hardware requirements, refer to the Release Guide for the MMP for ATCA software version you are using. Required MMP hardware includes:

- Dialogic® Multimedia Platform Blade for AdvancedTCA with AMC
- Dialogic® Multimedia Platform IP+TDM (Rear Transition Module) RTM module
- Dialogic® Multimedia Platform RTM breakout box kit

### 2.2 Dialogic® Host Media Processing (HMP) Hardware/Software Requirements

If external loopback scenarios are used or connections to a 3G network or test tool are desired, a Dialogic® HMP Interface board (DNI board), which has a PSTN interface will be required. For a loopback scenario, at least two E1/T1 spans will be needed.

Dialogic HMP Software licenses for the 3G-324M Gateway, RTP, Dialogic® Multimedia, and Global Call SIP call control will also be needed, as required by the scenarios used.

### 2.3 Dialogic® Multimedia Kit (MMK) for PCIe Hardware/Software Requirements

Required hardware for the MMK for PCIe includes a Dialogic® Multimedia Accelerator Board for PCIe.

If external loopback scenarios are used or connections to a 3G network or test tool are desired, a DNI board will also be required. For a loopback scenario, at least two E1/T1 spans will be needed.

In addition to meeting the software license requirements in the release documentation, other possible requirements are:

- SIP – one or two SIP video endpoints as described in the previous section
- 3G – a 3G network connection or a simulated 3G endpoint to initiate a 3G call (optional) if one of the loopback modes are not used
- An ISDN/CC gateway
- An ISDN or SS7 signaling endpoint

## 3 Preparing to Run the Demo

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This chapter describes what you need to do before running the Dialogic® 3G-324M Multimedia Gateway Demo, should you choose to do so.

- [PSTN Board Configuration](#)
- [The 3G-324M Multimedia Gateway Configuration File](#)
- [Sample Configuration Files](#)

### 3.1 PSTN Board Configuration

Certain scenarios use a TDM E1/T1 network interface. This must be configured correctly to carry 3G data. Internal loopback and scenarios that use Nb UP transport do not require a TDM network interface.

#### 3.1.1 Clear Channel

Clear channel is used for external connections, either to an ISDN or SS7 signaling gateway or for an external loopback test scenario. No signaling is done on the board in this case. Instructions for configuring the interface on the Dialogic® Multimedia Platform for AdvancedTCA can be found in the Dialogic® Multimedia Platform Blade for AdvancedTCA Technical Product Specification.

Configuring the interface on the Dialogic® HMP Interface board (DNI board) under Dialogic® Host Media Processing Software or Dialogic® Multimedia Kit for PCIe can be found in the Dialogic® System Configuration Guide.

#### 3.1.2 ISDN

ISDN is available on Dialogic HMP Software and Dialogic Multimedia Kit (MMK) for PCIe only.

For a direct connection to an external ISDN switch or for testing loopback scenarios using ISDN, the E1/T1 interface must be configured correctly to match the ISDN protocol being used. That is beyond the scope of this document. Refer to the Dialogic System Configuration Guide.

If using an external loopback scenario with ISDN, remember that one E1/T1 span must operate in the default User mode and the other must be configured to work in the Network mode.

Data streams must also be configured on Dialogic HMP Software or MMK for PCIe to allow communication between the DNI board and the Dialogic HMP/MMK software. Again, refer to the Dialogic System Configuration Guide for instructions on how to do this. Consult the section “Transparent Data Routing for 3G-324M”.

### **3.1.3 SS7**

SS7 is available on Dialogic® HMP Software only.

When using SS7 signaling via Sigtran, all DS0 channels are configured as clear channel. See the Clear Channel section above. SS7 also requires a working SS7/Sigtran/GlobalCall installation on the 3G gateway system. Setting this up is beyond the scope of this document. Refer to the application note “Configuring an SS7/Sigtran Demo System on Host Media Processing 3.1LIN” for instructions on downloading the SS7 software and configuring the system.

## 3.2 The 3G-324M Multimedia Gateway Configuration File

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

- Configuration File Location
- Sections in the Configuration File *config.txt*

The demo runs with the help of the configuration file named *config.txt*. Before running the 3G-324M Demo, the file must be set to reflect your endpoint configuration, system environment and 3G-324M settings. Each section in the configuration file is explained below.

### 3.2.1 Configuration File Location

This configuration file *config.txt* should reside in the Release directory of the demo.

In addition, a set of sample configuration files in the *sample\_config\_files* directory accompany the demo. Copy a file from this directory into *config.txt* as the starting point for your scenario.

### 3.2.2 Sections in the Configuration File

#### Endpoint Configuration

This parameter section designates the endpoint configuration setup for the application. There are three types of endpoints:

- 3G endpoint – the devices used to connect to a remote 3G-324M device. They, in turn, can be paired with either a SIP, MM, or another 3G endpoint
- SIP endpoint – the devices used to connect to a remote SIP device
- MM endpoint – the multimedia devices that will terminate the 3G call

#### 3G Endpoint

The 3G endpoint specifies the devices used in making a 3G connection to a 3G-324M device. It has the following attributes:

Endpoint Number – EP: <n> – A unique numerical endpoint number. All endpoints should be consecutively numbered

Endpoint type – m3g – The 3G endpoint type designates the 3G side of the call

Control Device – m3gB<x>T<y> - The 3G device that handles the 3G call for this endpoint

Stream Device – Four entries for stream devices are possible:

External clear channel - dtiB<x>T<y> - The E1/T1 data channel that carries the H.223 multiplexed data

ISDN - IdtiB<x>T<y> - The E1/T1 data channel that carries the H.223 multiplexed data. The span specified also carries ISDN signaling to an external ISDN switch. (Dialogic HMP Software and MMK only)

SS7 - SdtiB<x>T<y> - SS7/Sigtran is used to provide signaling for the E1/T1 data channel that carries the H.223 multiplexed data. (Dialogic HMP Software only)

NBUP – ipmB1C<x> - The IP channel that carries the H.223 multiplex data

InternalLoopback - NONE – Used to designate internal loopback mode where no transport is needed for H.223 multiplex data

Local Peer - <n> - Specifies the number of the corresponding SIP or MM endpoint for this 3G endpoint. Each 3G endpoint must have a SIP or 3G endpoint.

Loopback Peer - <n> - Specifies the corresponding 3G endpoint for 3G to 3G internal/external loopback mode. When loopback mode is not desired, a 0 should be entered. When using ISDN and SS7 stream devices, a loopback peer does not need to be specified, since the signaling for call setup/teardown is done by the respective protocol rather than directly by the gateway application.

Map ID - <text> – Specifies a unique text string to identify an endpoint for socket commands when an external ISDN signaling gateway is used.

### **SIP Endpoint**

The SIP endpoint specifies the devices used to make a SIP connection. Since this is a bidirectional gateway that is primarily used in a loopback mode, SIP endpoints are usually entered in pairs. Odd numbered devices (e.g. iptB1T1, iptB1T3) are used for outbound calls and even numbered devices (e.g. iptB1T2, iptB1T4) are used for inbound calls. Also, each SIP device must be paired with a corresponding 3G device.

A SIP endpoint has the following attributes:

Endpoint Number – EP:<n> – A unique numerical endpoint number. All endpoints should be consecutively numbered

Endpoint type – sip – The SIP endpoint type designates the SIP side of the call

Control Device – iptB<x>T<y> - Specifies the ipt device that handles the SIP call control for this endpoint

Stream Device – ipmB1T<y> - Specifies the ipm device used for RTP data traffic for this endpoint

Local Peer – <n> – Specifies the number of the corresponding 3G endpoint for this SIP endpoint. Each SIP endpoint must have a 3G endpoint

Loopback Peer – 0 – This parameter is not used for the SIP endpoint

Map ID – none – This parameter is not used for the SIP endpoint

Note: Many parameter configuration settings beyond this endpoint setting have an “Endpoints” column. The value in this column refers back to the endpoint number defined here. If there are, for example, four 3G endpoints, there must be an entry for each of them in further 3G parameter configuration.

Below is an example of endpoint definitions that may be used for internal loopback, external loopback and an external connection to an ISDN gateway. (Only the external loopback is active – the others are commented out.)

```
#####
# Endpoint      Endpoint      Control      Stream      Local      Loopback      Map ID
# Number        Type          Device        Device        Peer        Peer
#####
# Internal loopback
#EP: 1          m3g           m3gB1T1      NONE          3           2           1
#EP: 2          m3g           m3gB1T2      NONE          4           1           2
#
# Clear channel external loopback connection from span 1 to span 2
#EP: 1          m3g           m3gB1T1      dtiB1T1      3           2           2
#EP: 2          m3g           m3gB1T2      dtiB2T1      4           1           1
#
# ISDN external loopback connection from span 1 to span 2
#EP: 1          m3g           m3gB1T1      IdtiB1T1     3           2           2
#EP: 2          m3g           m3gB1T2      IdtiB2T1     4           1           1
#
# NBUP loopback connection from span 1 to span 2
#EP: 1          m3g           m3gB1T1      ipmB1C1      3           2           2
#EP: 2          m3g           m3gB1T2      ipmB1C2      4           1           1
#
# External connection to ISDN Gateway
#EP: 1          m3g           m3gB1T1      dtiB1T1      3           2
:N_DTIB1T1:P_ISDN
#EP: 2          m3g           m3gB1T2      dtiB2T1      4           1
:N_DTIB2T1:P_ISDN
#
# SIP endpoints the same in either case
#EP: 3          sip           iptB1T3      ipmB1C3      1           0           none
#EP: 4          sip           iptB1T4      ipmB1C4      2           0           none
#####
```

### Multimedia Endpoint

The multimedia endpoint specifies the devices used to terminate 3G calls. It has the following attributes:

Endpoint Number – EP: <n> – A unique numerical endpoint number. All endpoints should be consecutively numbered

Endpoint type – vmm – Multimedia device

Control Device – none

Stream Device – mmB<x>C<y> – Specifies the media device

Local Peer – <n> – Specifies the number of the corresponding 3G endpoint for this multimedia endpoint. Each multimedia endpoint must have a 3G endpoint

Loopback Peer – <n> – always “0”

Map ID – <text> – always “none”

Below is an example of a single 3G device terminated at a multimedia device:

```
#####
# Endpoint      Endpoint      Control      Stream      Local      Loopback      Map ID
# Number        Type          Device        Device        Peer        Peer
#####
#
# Configuration for a single inbound 3G terminating at an MM
#
# 3G endpoint associated with an MM endpoint
EP: 1          m3g          m3gB1T1      dtiB1T1      2          0          3G-EP1
#
# Single Multimedia endpoint
EP: 2          vmm          none          mmB1C1       1          0          none
#
#####
```

## Logging

This configuration section specifies whether application event and error logging will be enabled (ON) or disabled (OFF). If logging is enabled, log output will be collected in the file, *logfile.txt*.

```
#####
# Logging (ON/OFF):
#####
LOG: ON
#####
```

## DTMF Type

A switch (on/off) may be set so that the gateway will either use a SIP INFO message (on) or use RFC2833 (off) for DTMF signaling with an external SIP device.

```
#####
# SIP INFO DTMF (ON/OFF):
#####
SIP_INFO_DTMF: OFF
#####
```

## Board Parameter Settings

This parameter configuration section allows the user to set application specified 3G board parameters. The format to set a board parameter is *PRM:<Parameter Name> <value>*

```
#####
Board Parameters:
#####
PRM: DIGIT_TO_MEDIA 1          # Activate UII-RFC2833 DTMF translation (values: 0/1)
PRM: DIGIT_TO_H245 1          # Activate RFC2833-UII DTMF translation (values: 0/1)
PRM: FASTUDPATE_TO_MEDIA 1    # Activate Video Fast Update relay to Media (values:0/1)
PRM: FASTUDPATE_TO_H245 1    # Activate Video Fast Update relay to H245 (values:0/1)
# PRM: SKEWINDICATION          # Set Skew Indication (values: )
# PRM: AUDIOVISUALSYNC         # Set AudioVisual Synch (values: )
# PRM: RETRANSMIT_ON_IDLE      # Set Retransmit on Idle (values: )
PRM: H245_TERMINAL_TYPE 127 # Set H245 Terminal Type (values: 0-255)
# PRM: MAX_CCSSL_SEGMENT 255   # Set Maximum CCSRL Segment size (values: 0-255)
#####
```

## Event Notification

This parameter configuration section allows the user to specify the maskable 3G-324M library events reported to the application. Parameters in this section overwrite the default values.

The parameter format to enable the event is *ENEV*:<Event Name> and to disable the event is *DSEV*:<Event Name>

```
#####
# Event Notification:
# ENEV:=Enable      DSEV:=Disable
#####
# ENEV: H245_UII_EVT      # H245 User Input Indication (UII) Digit received event.
# ENEV: FASTUPDATE_EVT   # H245 Fast Video Update (FVU) received event.
# ENEV: TEMP_SPAT_TRDFF_EVT # H245 Temporal Spatial Tradeoff received event
# ENEV: VIDEO_FREEZE_EVT # H245 Video Freeze received event
# ENEV: SYNC_GOB_EVT     # H245 Video Synch every GOB received event*
# ENEV: SKEW_INDICATION_EVT # H245 Skew Indication received event
ENEV: VERBOSE_MSD_EVT    # Master/Slave Determination event reporting
ENEV: MES_EVTS_EVT      # MES event reporting
Note: Events designated with * are disabled by default
#####
```

## H.223 Session

This parameter configuration section allows the user to specify parameters related to the physical multiplex layer or H.223 session for each endpoint or group of endpoints. The parameter format for configuring the H.323 session is  
HSES:<endpoint/endpoint range> <Mux Level> <Max AL2 size>  
<WSNRP(T/F)> <Multiple Msgs(T/F)>

```
#####
# H223 Session:
# Default H223MuxLevel: L0 - Level0
#                               L1 - Level1
#                               L1D - Level1 Double Flags
#                               L2 - Level2
#                               L2H - Level2 Optional Header
#                               L3 - Level3
#                               L3H - Level3 Optional Header
# Endpoint      Mux      MaxAL2  WSNRP   MultipleMsgs
#                               Lvl      Size    (T/F)   Per PDU (T/F)
#####
HSES: 1          L2      1024    T        T
#####
```

## H.223 Capabilities

This parameter configuration section allows the user to specify the H.223 capabilities for the endpoint or group of endpoints.

```
#####
# H223 Capabilities:
# Options:
# AL: AudioAL1 0x01          Bitrate: 320 or 640 (x 100bps)
#   AudioAL2 0x02
#   AudioAL3 0x04          MobileOpXmtCap: none: 0x00
#   VideoAL1 0x08          mode change: 0x01
#   VideoAL2 0x10          AnnexA: 0x02
#   VideoAL3 0x20          AnnexADblFlag 0x04
#                           AnnexB 0x08
#                           AnnexBwHeader 0x10
#   MaxAL2Size:0-64k
#   MaxAL3Size:0-64k
# Endpoint  AL  AL2  AL3  AnxA  Dbl  AnxB  AnxB  RS  MblOp  Bit
#           Size Size Size Frame Flag Frame Hdr  Code Xmt  Rate
#####
HCAP: 1      18  512  512  T    T    T    T    T    T    600
#####
```

## Terminal Capabilities

This parameter configuration section allows the user to specify the Terminal Capabilities for each endpoint or group of endpoints. Terminal Capabilities are supported Audio/Video codecs designated by the endpoint for each 3G call. Possible values for terminal capabilities include AMR and G.723 for audio codecs and H.263 for video codec.

```
#####
# Terminal Capabilities:
#
# Endpoint  Capabilities
#####
MCAP: 1      amr  h263
MCAP: 2      amr  h263
#####
```

## OpenLogicalChannel H.223 Parameters

This parameter configuration section allows the user to specify the OpenLogicalChannel Parameters for the H.223 physical multiplexing layer.

```
#####
# OpenLogicalChannel H223 Parameters:
#
# ALTypes: AL1_FRM
#           AL1
#           AL2_SEQ
#           AL2
#           AL3
#
# Endpoint  Audio  Video  Segmentable  Segmentable  AL3 Control  AL3 Send
#           AL    AL    Audio        Video        Field Size  Bufr Size
#####
HOLC: 1    AL2    AL2    F            T            0           256
#####
```

## Transcoder Mode and SIP Coders

Only valid on Dialogic MMP 2.0 and Dialogic MMK Releases.

This parameter configuration section enables native (NATIVE) or transcoding(TRANSCODE) connection between 3G and IPM devices. When TRANSCODE mode is selected on a supported release, the SIP Audio and Video Coders can be specified the SIP Coders section. By default, if the Transcode mode is not set or SIP Coders are not specified, H.263 and AMR codecs are used in “native” mode.

SIP supported coders (only the first codec per field is used)

SIPVID: h263 mpeg4

SIPAUD: amr g711u g711a g723

```
#####
# XCDRMODE (NATIVE/TRANSCODE) :
#####
# XCDRMODE: NATIVE
#####

#####
# SIP Coders
#
# This features is only supported on releases that include video transcoding
# (ie, MMP2.0...)
# Note XCDRMODE must be set to TRANSCODE
#####
SIPVID: h263
SIPAUD: amr
#####
```

## SIP Endpoint Parameters

This parameter configuration section allows the user to specify the IP addresses for outbound SIP calls. Note that all SIP endpoints use the same outbound address – that is, they are not individually settable.

Orig IP Addr – is the originating IP4 IP address for the 3G-324M gateway application in the usual 4 part dotted notation

Dest IP Addr – is the destination IP4 IP address for outgoing SIP calls in the usual 4 part dotted notation

Orig SIP Addr – is the originating SIP address for the 3G-324M gateway application in the form <phone number>@<ip address>:<sip udp port>

Dest SIP Addr – is the destination SIP address for outgoing SIP call in the form <phone number>@<ip address>:<sip udp port>

Max SIP Chans -<n> - the maximum number of SIP channels licensed on the system

```
#####
# SIP Endpoint Parameters
#
#      Orig IP Addr   Dest IP Addr   Orig SIP Addr       Dest SIP Addr
# Max SIP Chans
#####
# Example for SIP endpoint running on same system on port 5060. Gateway is on
# port 5062.
# SIPINFO: 192.168.1.117 192.168.1.117 123@192.168.1.117:5062
# 1000@192.168.1.117:5060 4
#####
```

## Command Information

This set of parameters is only used when an external ISDN (or SS7) signaling gateway is used to front-end calls into the 3G-324M gateway. Connect and disconnect commands are sent via a UDP socket to the address specified using the local ports given here.

If no gateway is used, but rather just an external loopback connection between two spans on the SIP-3G gateway system, specify the IP address of the gateway system.

If the internal loopback mode is used, this parameter will be ignored.

```
#####
# IP Address and Port Info for Connect/Disconnect Commands
#
#      Remote System IP Addr   Local Rcv Port   Local Send Port
#####
# Next line for local external loopback
#CMDINFO: 146.152.99.121      40121           40121
#
# Next line for ISDN gateway
#CMDINFO: 146.152.99.151      40121           40122
#####
```

## Multimedia Information

This set of parameters is used when a multimedia endpoint is paired with a 3G endpoint. It determines the function of the multimedia device when the call is connected. The Direction is either PLAY or RECORD.

Only one operation per call is allowed. The A/V file pairs need to be specified for the desired operation. The other two file names are ignored.

```
#####
# This entry controls the behavior of the Multimedia endpoints
#
# PLAY/RECORD - what it does
# File Names - separate audio/video with unique names for play and record
#
#      Dir      Audio Play File   Video Play File   Audio Rec File   Video Rec File
#####
#MMINFO: PLAY   testmenu.aud       testmenu.vid     recording.aud     recording.vid
#MMINFO: RECORD testmenu.aud       testmenu.vid     recording.aud     recording.vid
#####
```

## Nb UP Information

This set of parameters must be set when Nb UP is used for a transport on a 3G endpoint. Each pair of 3G endpoints using Nb UP must have one Send and one Receive direction for the protocol to connect. IP addresses must be the same, as Nb UP is only supported in a loopback mode for the demo. Nb UP ports should start at 40960 and increment by 2 for each Nb UP endpoint.

```
#####  
#  
# Only Needed if NBUP is used.  
#  
# Make sure endpoints are defined before this entry, as it refers back to them  
#  
#           3G Endpoint  Nbuf Dir   Remote Nbuf IP Addr   Remote Nbuf  
#                                     Port  
#####  
#  
# Here, Nbuf connection is on the same system, on ports 40960 and 40962  
#  
NBUPINFO:      1           S           192.168.1.117           40962  
NBUPINFO:      2           R           192.168.1.117           40960  
#####
```

### 3.3 Sample Configuration Files

A number of configuration files for various scenarios are contained in the sample\_config\_files directory. Additional scenarios are possible as well. But these samples have been tested, and should require little or no changes for use.

The platforms listed in the table are: Dialogic® Host Media Processing Software Release 3.1LIN (HMP 3.1), Dialogic® Multimedia Software for AdvancedTCA (MMP) Releases 1.1 and 2.0, and Dialogic® Multimedia Kit Software Release 1.0 for PCIe (MMK).

**Table 1. Sample Configuration Files**

Sample config file	Connection	Description	Platforms	Notes:
config_3g-hairpin-cc-isdngw.txt	Isdngw→dti[1](cc)→m3g[1]→  Isdngw←dti[2](cc)←m3g[2]←	3G Hairpin – Inbound 3G call bridged to outbound 3G call [clearchannel calls using isdngw]	HMP3.1(cc) MMP1.1 MMP2.0 MMK(cc)	Requires Isdngw
config_3g-mm-cc-isdngw.txt	Isdngw→dti(cc)→m3g→mm	3G Multimedia - Inbound 3G call [over clearchannel using isdngw] to mm	HMP3.1(cc) MMP1.1 MMP2.0 MMK(cc)	Requires Isdngw
config_3g-mm-isdn.txt	dti(isdn)→m3g→mm	3G Multimedia - Inbound 3G call [using isdn protocol] to mm	HMP3.1(isdn) MMK(isdn)	*not supported on MMP
config_3g-sip-cc-isdngw.txt	Isdngw→dti(cc)→m3g→sip	3G Gateway – Inbound 3G call [over clearchannel using isdngw] to outbound SIP call.	HMP3.1(cc) MMP1.1 MMP2.0 MMK(cc)	Requires Isdngw
config_3g-sip-isdn.txt	dti(isdn)→m3g→sip	3G Gateway – Inbound 3G call [using isdn protocol] to outbound SIP call.	HMP3.1(isdn) MMK(isdn)	*not supported on MMP
config_sipin-3g-hairpin-sipout-ccexternal.txt	←dti[1](cc)←m3g[1]←sip[1]  →dti[2](cc)→m3g[2]→   ←dti[3](cc)←m3g[3]←   →dti[4](cc)→m3g[4]→sip[2]	3G Hairpin (loopback)– Inbound SIP call, external clearchannel loopback with 3G bridging, outbound SIP call	HMP3.1(cc) MMP1.1 **MMP2.0 MMK(cc)	Requires external cross-over cable ***not supported with MMP2.0 advanced video licenses
config_sipin-3g-hairpin-sipout-isdnexternal.txt	←dti[1](isdn)←m3g[1]←sip[1]  →dti[2](isdn)→m3g[2]→   ←dti[3](isdn)←m3g[3]←   →dti[4](isdn)→m3g[4]→sip[2]	3G Hairpin (loopback)– Inbound SIP call, external isdn loopback with 3G bridging, outbound SIP call	HMP3.1(isdn) MMK(isdn)	*not supported on MMP
config_sipin-mm-ccexternal.txt	←dti[1](cc)←m3g[1]←sip  →dti[2](cc)→m3g[2]→mm	3G Multimedia (loopback) - Inbound SIP call, 3G external clearchannel loopback, to mm	HMP3.1(cc) MMP1.1 **MMP2.0 MMK(cc)	Requires external cross-over cable ***not supported with MMP2.0 advanced video licenses

Sample config file	Connection	Description	Platforms	Notes:
config_sipin-mm-internal.txt	←m3g[1]←sip  →m3g[2]→mm	3G Multimedia (loopback) - Inbound SIP call, 3G internal loopback, to mm	HMP3.1 MMP1.1 MMP2.0 MMK	
config_sipin-mm-isdnexternal.txt	←dti[1](isdn)←m3g[1]←sip  →dti[2](isdn)→m3g[2]→mm	3G Multimedia (loopback) - Inbound SIP call, 3G external isdn loopback, to mm	HMP3.1(isdn) MMK(isdn)	Requires external cross-over cable *not supported on MMP
config_sipin-mm-nbup.txt	←ipm-nbup[1]←m3g[1]←sip  →ipm-nbup[2]→m3g[2]→mm	<u>3G Multimedia (loopback)</u> - Inbound SIP call, 3G NbUP loopback, to mm	HMP3.1 MMP1.1 MMP2.0 MMK	
config_sipinout-cc-isdngw.txt	Isdngw←dti[1](cc)←m3g[1]←sip[1] Isdngw→dti[2](cc)→m3g[2]→sip[2]	<u>3G Gateway –</u> Inbound SIP call to outbound 3G call. Inbound 3G call to outbound SIP call.	HMP3.1(cc) MMP1.1 **MMP2.0 MMK(cc)	Requires Isdngw
config_sipin-sipout-ccexternal.txt	←dti[1](cc)←m3g[1]←sip[1]  →dti[2](cc)→m3g[2]→sip[2]	<u>3G Gateway (loopback) –</u> Inbound SIP call, 3G external clearchannel loopback, to outbound SIP call.	HMP3.1(cc) MMP1.1 **MMP2.0 MMK(cc)	Requires external cross-over cable **not supported with MMP2.0 advanced video licenses
config_sipin-sipout-internal.txt	← m3g[1]←sip[1]  → m3g[2]→sip[2]	<u>3G Gateway (loopback) –</u> Inbound SIP call , 3G internal loopback, to outbound SIP call.	HMP3.1 MMP1.1 MMP2.0 MMK	
config_sipin-sipout-isdnexternal.txt	←dti[1](isdn)←m3g[1]←sip[1]  →dti[2](isdn)→m3g[2]→sip[2]	<u>3G Gateway (loopback) –</u> Inbound SIP call , 3G external isdn loopback, to outbound SIP call.	HMP3.1(isdn) MMK(isdn)	Requires external cross-over cable *not supported on MMP
config_sipin-sipout-nbup.txt	←ipm-nbup[1]←m3g[1]←sip[1]  →ipm-nbup[2]→m3g[2]→sip[2]	<u>3G Gateway (loopback) –</u> Inbound SIP call , NbUP 3G loopback, to outbound SIP call.	HMP3.1 MMP1.1 MMP2.0 MMK	

# 4 Compiling and Linking

---

This section contains the following information:

- Dialogic® MMP Software for ATCA Procedure
- Dialogic® HMP Software and Dialogic® MMK for PCIe Procedure for compiling and Linking
- Modifying the Demo

## 4.1 Dialogic® MMP Software for ATCA Procedure

To compile the source code for the Dialogic® 3G-324M Multimedia Gateway Demo application on the Dialogic® Multimedia Platform for AdvancedTCA, do the following:

1. Go to this location: `${DIALOGIC_DIR}/demos/3GDemo/m3g-sip_gateway`
2. At the command prompt, type `make clean; make`

## 4.2 Dialogic® HMP Software and Dialogic® MMK for PCIe Procedure

To compile the source code for the 3G-324M Demo application on the Multimedia Platform, do the following:

1. Go to this location: `${DIALOGIC_DIR}/demos/3GDemo/m3g-sip_gateway`
2. Edit the Makefile to enable the `PLATFORM = -DHMP` line by deleting the `#` comment delimiter
3. At the command prompt, type `make clean; make`

## 4.3 Modifying the Demo

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

1. Put the files in `${DIALOGIC_DIR}/demos/3GDemo/m3g-sip-mm_gateway`
2. Modify the Makefile to take into account the new files generated by adding the filename.o to the OBJS variable
3. At the command prompt, type `make clean; make`

Successful compilation will result in an executable called `m3g-sip_gateway` at the following location: `${DIALOGIC_DIR}/demos/3GDemo/m3g-sip_gateway/Release`

# 5 Running the Demo

---

This section describes how to start the Dialogic® 3G-324M Multimedia Gateway Demo and contains the following information:

- Preparation
- Procedure
- Exiting the Demo
- Sample Output

## 5.1 Preparation

Before running the demo, be sure to follow the instructions provided in [Preparing to Run the Demo](#).

In a normal installation, the Dialogic® Multimedia Platform for AdvancedTCA, the Dialogic® Multimedia Kit for PCIe, or the Dialogic® Host Media Processing Software is automatically started during system boot-up.

## 5.2 Procedure

To start the 3G-324M Demo, you can do the following:

1. Launch a terminal window.
2. Change to the following directory:  
`${DIALOGIC_DIR}/demos/3GDemo/m3g-sip_gateway/Release.`
3. At the command prompt, type `./m3g-sip_gateway`.

The 3G-324M gateway application will be ready for incoming SIP and 3G calls.

## 5.3 Exiting the Demo

Stopping the demo is done through the command line. Enter a “Q” to stop the demo. This is best done when all devices and channels are in an idle or inactive state. If the demo fails to shut down and exit after 10-15 seconds, two Ctrl-C’s should be issued. This will force the 3G devices to reset and exit cleanly. If the demo still does not exit, four additional Ctrl-C’s should be issued. This will abort the demo process. If this is done, it may be necessary to reset the terminal window with a “reset” command and stop and start the Dialogic® services with “dlstop” and “dlstart”.

## 5.4 Sample Output

The example below shows the sample display output for a pair of 3G devices (endpoint 3G 1 & 2) configured to bridge to a pair of SIP devices (endpoint SIP 3 & 4). The 3G devices are both armed and ready to synchronize to H.223 data after indication of an available call.

One SIP device is idle and in a wait-for-call state, prepared to take an inbound SIP call. The second SIP device is in an idle state, ready to make an outbound call.

Two bridge devices (device BRG 1 & 2) display the state machine that coordinates its 3G device and SIP device.

```
=====
                          3G-324M - SIP GATEWAY DEMO
=====
STATE:      AUDIO:          VIDEO:          MISC.
            TxLCN: RxLCN:  CAP:  TxLCN: RxLCN: CAP:  CMD/IND:
=====
M3G 1: H245_INACTIVE      0    0    none    0    0    none
M3G 2: H245_INACTIVE      0    0    none    0    0    none
SIP 3: IDLE                0    0    n/a     0    0    n/a
SIP 4: IDLE                0    0    n/a     0    0    n/a
BRG 1: IDLE                M3G:1 <-> SIP:3
BRG 2: IDLE                M3G:2 <-> SIP:4

PROMPT: (Q)uit
```

## 5.5 Using the Demo

This section describes how to use the 3G-324M Demo. First, start the demo as described in [Procedure](#).

### 5.5.1 Connecting a Call

Once the 3G-324M Demo is started, it is armed and ready to receive 3G calls on the 3G control devices connected to the DS0 timeslots specified by the DTI streaming devices. If SIP endpoints are used, they are also ready to receive calls via the system's Ethernet connection. Depending on the gateway's configuration, incoming calls will be directed to:

- An outbound 3G/SIP endpoint pair, resulting in an outbound SIP call
- A multimedia endpoint, resulting in a audio/video file play or record
- A 3G endpoint pair, resulting in an outbound 3G call

### 5.5.2 Disconnecting a Call

To stop the 3G-324M Demo during a call, simply hang up the 3G mobile device or SIP phone. Endpoints and bridged objects will return to inactive or idle states.

# Appendix

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## Using the Kapanga SIP Softphone with the Dialogic® 3G-324M Multimedia Gateway Demo

A sample Kapanga config file, *3ggw.cfg*, can be downloaded from the Dialogic FTP site for use with the gateway Demo. Notable differences beyond the default configuration are:

- Direct IP to IP (no SIP proxy)
- Video rate control on
- Video rate set to 30Kbps
- Display real time bandwidth and MOS
- QCIF resolution set
- Audio/Video codecs set to AMR/H.263
- SIP port of target system (3G-324M Gateway) = 5062

The config file can be activated on the Kapanga > Config > Switch to File Mode. Select the file with Kapanga > File > Open > *3ggw.cfg*. IP address must still be set for your gateway system.

## Using SIPp with the Dialogic® 3G-324M Multimedia Gateway Demo

SIPp may be downloaded from [http://sourceforge.net/project/showfiles.php?group\\_id=104305%20](http://sourceforge.net/project/showfiles.php?group_id=104305%20). Follow the instructions for building the utility on Linux.

Two scripts and a set of media files may be downloaded from the Dialogic FTP site in furtherance of SIPp use. The Helicopters media files contain a short A/V clip in PCAP format.

The scripts are for configuring and starting SIPp. The “runuas” script invokes videouas.xml - SIPp as a user agent server:

- Waits for a SIP call
- Accepts a call
- Plays an audio and video stream from the two PCAP files specified
- Holds the call until disconnected from far end

The “runuac” script invokes videouac.xml - SIPp as a user agent client:

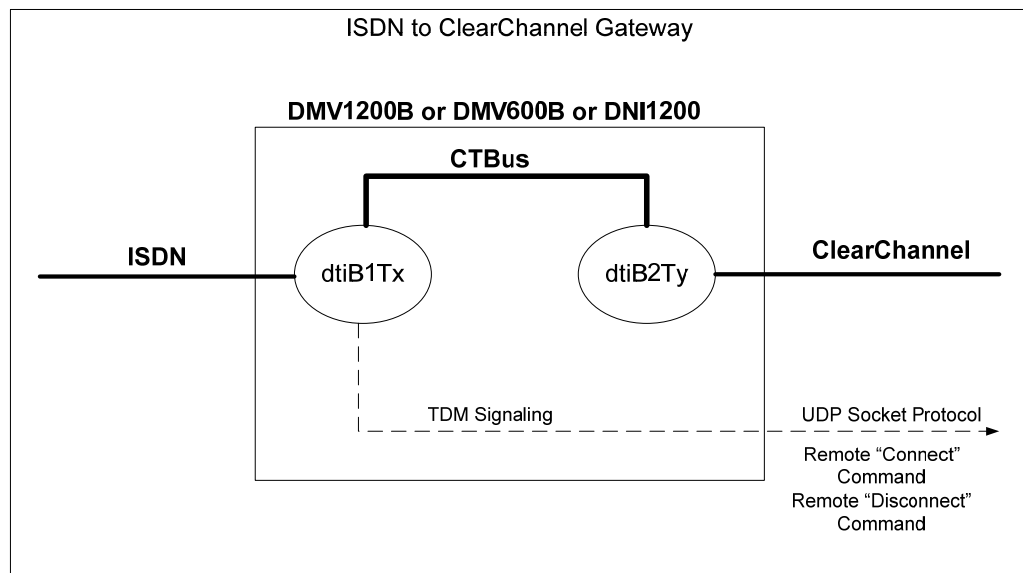
- Places an outbound SIP call
- On answer, plays an audio and video stream from two PCAP files
- Pauses while files play
- Hangs up

IP addresses must be changed in runuac and runuas to that of the 3G-324M gateway system. The scripts expect to be run in the same directory as the SIPp executable.

## ISDN to ClearChannel Gateway

This section suggests one method to provide an ISDN to ClearChannel gateway needed for Dialogic® Multimedia Platform for AdvancedTCA (MMP) connection to ISDN.

The MMP provides a ClearChannel TDM connection (i.e., bearer channel connection) for “Media only” traffic through the RTM Module. Incoming call control indication from the 3G PSTN network is normally done with ISDN or ISUP (SS7) signaling and depends on the 3G PSTN network connection. This section describes one example method to create a TDM signaling entity for an ISDN connection by detailing an ISDN to ClearChannel gateway. This example is provided as a quick method to provide incoming call indication to the Dialogic® 3G-324M Multimedia Gateway application.



**Figure 9. ISDN to ClearChannel Gateway Configuration**

An ISDN to ClearChannel gateway handles ISDN protocol on one trunk and makes a “media only” connection to ClearChannel on a second trunk. The ISDN to ClearChannel Gateway configuration is described in Figure 9: “ISDN to ClearChannel Gateway Configuration” above.

An ISDN to ClearChannel Gateway can be configured, for example, by setting up a Dialogic® HMP Interface Board (DNI Board) or a Dialogic® DM3 Media Board with E1 ISDN signaling on trunk 1, E1 ClearChannel on trunk 2, and the CT Bus configured as A-Law. Alternatively, the board can be set up in a T1 environment with T1 ISDN signaling on trunk 1, T1 ClearChannel on trunk 2, and the CT Bus configured as mu-Law. Using the Dialogic® Global Call API for PSTN network interface connection, an incoming call on the ISDN trunk 1 (dtiB1Tx) is routed through the CTBus to the ClearChannel port on trunk 2 (dtiB2Ty) with the appropriate “listen” commands. For call indication purposes, a UDP Socket protocol, found in the Appendix , “UDP Socket Protocol” can be used to send

remote “Connect” and “Disconnect” command messages to the 3G-324M Gateway application. For example code to demonstrate the Global Call model, please see the `gc_basic_call_model` demo code provided with the Dialogic System Release. An example ISDN to ClearChannel application can be downloaded from the Dialogic FTP site for use with the gateway.

## UDP Socket Protocol

This section identifies one example method for providing incoming call signaling identification from a remote signaling gateway to the Dialogic® 3G-324M Multimedia Gateway Demo (3G-324M Demo).

TDM SS7 or ISDN call signaling is beyond the scope of the 3G-324M Demo. Therefore, the 3G-324M Demo provides a UDP socket command method for indicating an incoming TDM call and initiating the 3G-324M protocol. The UDP socket command protocol can be installed at the SS7 signaling entity or at the ISDN to ClearChannel gateway entity. On an incoming call, a remote “connect” message is sent to the 3M-324M Demo to signify that an incoming call has been connected to a particular timeslot. The UDP socket commands provide a remote network indication of the incoming connect or disconnected call similar to a user keyboard indication. The format of UDP socket command for Connect is [`‘C <Map ID> <calling number>:<called number>’`] and the format of the disconnect command is [`‘D <Map ID>’`]. This is a useful method to indicate an incoming connect or disconnect on a particular DS0. Sample code for this socket command is included below.

```
// Remote Mux3G Gateway Macro Declarations
#define APP_CMD_PORT    40121    // cmd port used by M3G Gateway
#define REMOTE_HOST     "146.152.80.84" // address of M3G Gateway

//To Connect
// send connect command to Mux3G Gateway
char command[80];
sprintf(command, "C %s %s:%s",pline->devname, "1111111111", "2222222222");
sendCmdToMux3G(command);

//To disconnect
// send disconnect command to Mux3G Gateway
char command[80];
sprintf(command, "D %s %s",pline->devname);
sendCmdToMux3G(command);

/*****
*   NAME: sendCmdToMux3G
*   DESCRIPTION: Send a UDP Packet to the Mux3G Gateway
*               to command the gateway to perform an action.
*   INPUT: cmd - command as string
*   RETURNS: none
*****/
void sendCmdToMux3G(char* cmd)
{
    static int initialized = 0;
    static int sockHand;
    struct sockaddr_in server;
    int length;
    int buflen;

    if (! initialized)
    {
        sockHand = socket(AF_INET ,SOCK_DGRAM , IPPROTO_UDP);
        if (sockHand < 0)
        {
            printandlog(ALL_DEVICES, MISC_WITH_NL, NULL, "sendCmdToMux3G() socket()
failure", 0);
            return;
        }
    }
}
```

```

        initialized = 1;
    }

    server.sin_family = AF_INET;
    server.sin_addr.s_addr = inet_addr(REMOTE_HOST);
    server.sin_port = htons(APP_CMD_PORT);
    length = sizeof(server);

    buflen = strlen(cmd) + 1;

    if (sendto(sockHand,
              cmd,
              buflen,
              0,
              (struct sockaddr *)&server,
              length) != buflen)
    {
        printandlog(ALL_DEVICES, MISC_WITH_NL, NULL, "sendCmdToMux3G() sendto()
failure", 0);
    }
}

```