

**Application Note  
GSM0308AN005**

**Configuring Hands-free Audio on  
the Enfora Enabler IIIG**

**Revision 1.00**

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## 1 Objective:

The target of this manual is to help Enfora modules users understand and get to know more about the implementation and feasibility of a loudspeaker and car kit applications using Enfora Enabler IIIG module. The manual describes two analog audio interfaces on Enabler III. The manual includes Enfora's recommendation for the implementation of loudspeaker and car kit applications. The audio relevant AT commands are described here as well.

## 2 Related Documents:

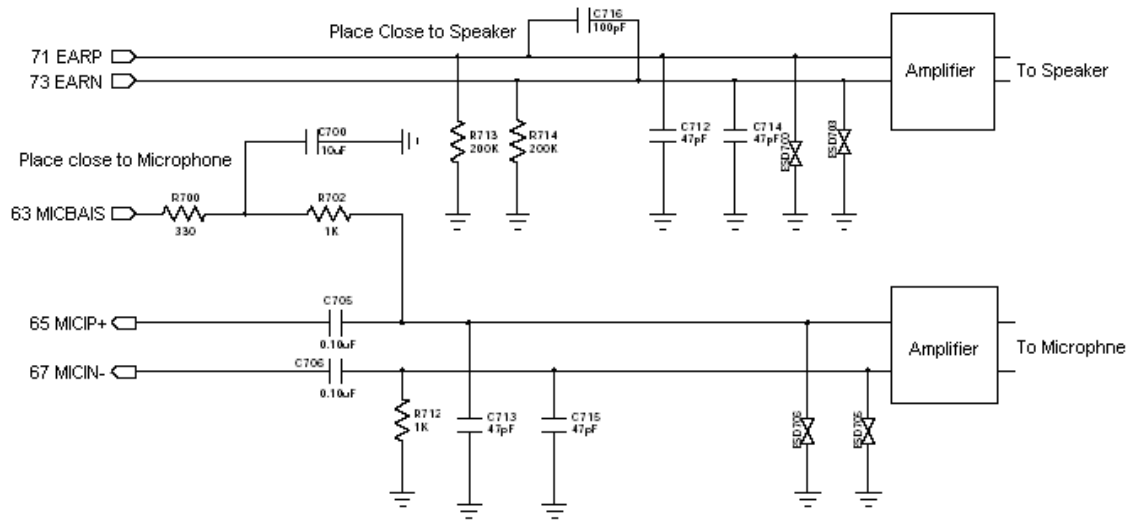
GSM0308IG001 - Enfora Enabler IIIG Integration Guide  
GSM0308AT001 - Enfora Enabler IIIG AT Command Set

## 3 Audio Considerations:

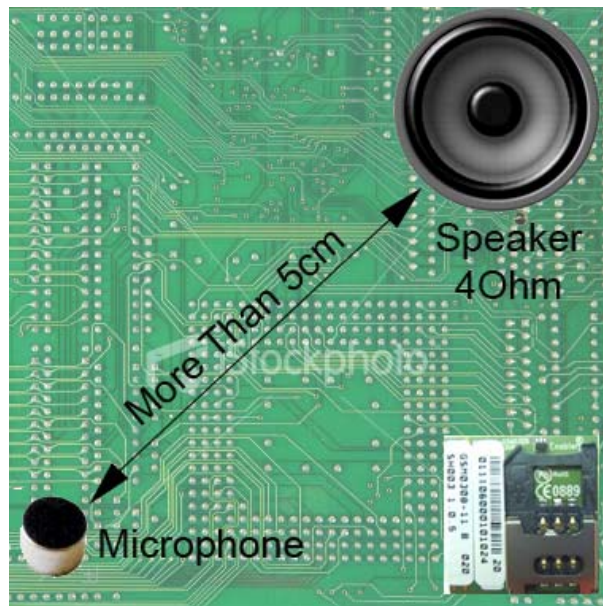
The audio quality is very dependent on the circuit design and layout. As an aid to obtaining good audio quality, a reference design has been included in the 'Audio Schematics' section of this document. When your application is working in a loudspeaker system and the microphone is fitted in the same box with the speaker, please follow these recommendations:

- Try to set the maximum possible distance between them; if it is possible at least 5cm.
- If you use an omni-directional type (and this is the typical application) seal it on the rear side (no back cavity) in order to not to collect unwanted signals; try to make the main axes of the microphone and speaker divergent.
- If you use an external microphone amplifier, set the module to the minimum possible gain.

#### 4 Audio Schematics:



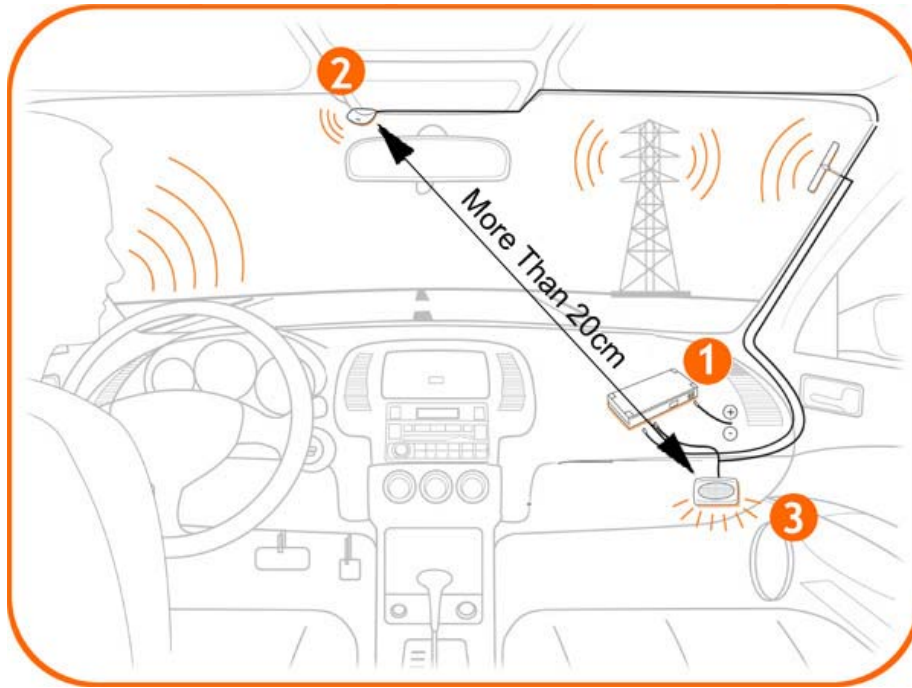
#### 5 Loudspeaker Implementation:



**Figure 2 - Loudspeaker**

In the loudspeaker the distance between the speaker and the microphone should be more than 5cm. In most cases, there is no need to add additional echo cancellation components.

## 6 Audio Car-Kit:



**Figure 3 - Car-Kit Diagram**

In the Car-Kit application the distance between the microphone (2) to the speaker (3) should be more than 20cm. There is no need to add additional echo cancellation components.

## 7 Relevant AT commands :

- **AT\$MICES** Echo suppression Control
- **AT\$VGR** Microphone Receiver Gain
- **AT\$VGT** Speaker Transmit Gain
- **AT\$VLVL** Speaker Volume
- **AT\$VST** Sidetone Volume
- **AT\$VSELECT** Voice Select

### 7.1 AT\$MICES Echo Suppression Control

**Command Function** This command allows the user to enable the echo suppressor and select the behavior for the current voice mode (see \$vselect)

**Command Format Query** AT\$MICES=?  
Response \$MICES: (0-1), (0-6)  
OK

**Write Format** AT\$MICES=<control>, <behavior>  
Response  
OK

**Read Format** AT\$MICES?  
Response \$MICES: <control>,< behavior type>  
OK

#### Parameter Values

< control > 0=> disable echo suppression.  
1=> enable echo suppression.

< behavior > 0 => Behavior 1  
1 => Behavior 1a  
2 => Behavior 2a  
3 => Behavior 2b  
4 => Behavior 2c  
5 => Behavior 2c\_idle  
6 => custom

**Note:** In loudspeaker and car-kit application, it is recommended to enable echo suppression with behavior 3 to 5.

## 7.2 AT\$VGR Microphone Receiver Gain

**Command Function** This command sets the receive level gain for the microphone input.

**Command Format Query** AT\$VGR=?  
Response \$VGR: (0-24)  
OK

**Write Format** AT\$VGR=<rxgain>  
Response \$VGR: <rxgain>  
OK

**Read Format** AT\$VGR?  
Response \$VGR: <rxgain>  
OK

<b>Parameter Values</b>	<rxgain>	0	-12 dB
		1	-11 dB
		2	-10 dB
		-	
		24	+12 dB

**Notes** If you use an external microphone amplifier, set the module to the minimum possible gain.

### 7.3 AT\$VGT Speaker Transmit Gain

**Command Function** This command is used to set the coarse speaker transmit gain.

**Command Format Query** AT\$VGT=?  
Response \$VGT: (0-12)  
OK

**Write Format** AT\$VGT=<txgain>  
Response \$VGT: <txgain>  
OK

**Read Format** AT\$VGT?  
Response \$VGT: <txgain>  
OK

#### Parameter Values

<txgain>	0	-6 dB
	1	-5 dB
	2	-4 dB
	3	-3 dB
	...	...
	12	+6 dB

**Notes** If you use an external speaker amplifier, set the module to the minimum possible gain.

## 7.4 AT\$VLVL Speaker Volume

**Command Function:** This command is used to set the speaker volume.

**Command Format Query** AT\$VLVL=?  
Response \$VLVL: (0-5)  
OK

**Write Format** AT\$VLVL=<volume>  
Response  
OK

**Read Format** AT\$VLVL?  
Response \$VLVL: <volume>  
OK

**Parameter Values**

<volume>	0	-Mute
	1	-24 dB
	2	-18 dB
	3	-12 dB
	4	-6 dB
	5	-0 dB

**Notes** After you set the speaker gain you can rise the speaker volume or mute the speaker.

## 7.5 AT\$VST Sidetone Volume

**Command Function:** This command is used to set the sidetone volume.

**Command Format Query:** AT\$VST=?  
Response \$VST: (0-9)  
OK

**Write Format** AT\$VST=<sidetone level>  
Response  
OK

**Read Format** AT\$VST  
Response \$VST: =<sidetone level>  
OK

### Parameter Values

<sidetone level>	0	-mute
	1	-23
	2	-20 dB
	3	-17 dB
	4	-14 dB
	5	-11 dB
	6	-8 dB
	7	-5 dB
	8	-2 dB
	9	+1 Db

**Notes** Sidetone is the sound of the speaker's own voice (and background noise) as heard in the speaker's receiver. Sidetone volume is usually suppressed relative to the transmitted high volume.

## 7.6 AT\$VSELECT Voice Select

**Command Function:** This command selects the voice mode of the device. Only valid options applicable to the hardware will be allowed. All applicable constants and settings are loaded when the mode is changed and at power up.

**Command Format** Query AT\$VSELECT=?  
Response \$VSELECT: (0,1,3)  
OK

**Write Format** AT\$VSELECT= <mode>  
Response OK

**Read Format** AT\$VSELECT?  
Response \$VSELECT: 0

**Execution Format** AT\$VSELECT  
Response \$VSELECT : <reset state>  
OK

### Parameter Values

<Mode> 0 Selects handset for voice  
1 Selects headset for voice  
3 Automatic mode

## Revision History:

Date	Rev	Description
6/27/2008	1.0	Initial release