

OMTP

LOCAL CONNECTIVITY: WIRED ANALOGUE AUDIO

This document contains information that is confidential and proprietary to OMTP Limited. The information may not be used, disclosed or reproduced without the prior written authorisation of OMTP Limited, and those so authorised may only use this information for the purpose consistent with the authorisation.

VERSION: 1.0

STATUS: Approved for publication

DATE OF PUBLICATION: 27th April 2007

OWNER: OMTP Limited



CONTENTS

1	Introduction	4
1.1	DOCUMENT PURPOSE	4
1.2	BUSINESS RATIONALE	4
1.3	INTENDED AUDIENCE	4
1.4	Conventions	4
2	LOCAL CONNECTIVITY: AUDIO CONNECTORS	6
3	USE CASES	7
3.1	HANDS FREE HEADSET COMPATIBILITY	7
3.2	MUSIC CONNECTIVITY	7
3.3	CONNECTIVITY TO COMPLEMENTARY AUDIO SYSTEMS	7
4	AUDIO CONNECTIVITY REQUIREMENTS	8
4.1	MECHANICAL	8
4.2	PINOUT	8
4.3	ELECTRICAL	10
5	FURTHER WORK	12
6	ABBREVIATIONS	13
7	DEFINITION OF TERMS	14
8	REFERENCED DOCUMENTS	15

 $^{^{\}circ}$ 2007 OMTP Ltd. All rights reserved. No part of this document may be reproduced or transmitted in any form or by any means without prior written permission from OMTP Ltd.

This document contains information that is confidential and proprietary to OMTP Limited. The information may not be used, disclosed or reproduced without the prior written authorisation of OMTP Limited, and those so authorised may only use this information for the purpose consistent with the authorisation.



The information contained in this document represents the current view held by OMTP Limited. on the issues discussed as of the date of publication.

This document is provided "as is" with no warranties whatsoever including any warranty of merchantability, non-infringement, or fitness for any particular purpose. All liability (including liability for infringement of any property rights) relating to the use of information in this document is disclaimed. No license, express or implied, to any intellectual property rights are granted herein.

This document is distributed for informational purposes only and is subject to change without notice. Readers should not design products based solely on this document.

Each Open Mobile Terminal Platform member and participant has agreed to use reasonable endeavours to inform the Open Mobile Terminal Platform in a timely manner of Essential IPR as it becomes aware that the Essential IPR is related to the prepared or published specification. The declared Essential IPR is publicly available to members and participants of the Open Mobile Terminal Platform and may be found on the OMTP Members Area.

The Open Mobile Terminal Platform has not conducted an independent IPR review of this document and the information contained herein, and makes no representations or warranties regarding third party IPR, including without limitation patents, copyrights or trade secret rights. This document may contain inventions for which you must obtain licenses from third parties before making, using or selling the inventions.

Defined terms and applicable rules above are set forth in the Schedule to the Open Mobile Terminal Platform Member and Participation Annex Form.

© 2007 Open Mobile Terminal Platform Limited. All rights reserved. No part of this document may be reproduced or transmitted in any form or by any means without prior written permission from OMTP Ltd. "OMTP" is a registered trademark. Other product or company names mentioned herein may be the trademarks of their respective owners.

^{© 2007} OMTP Ltd. All rights reserved. No part of this document may be reproduced or transmitted in any form or by any means without prior written permission from OMTP Ltd.

1 Introduction



1.1 DOCUMENT PURPOSE

This document defines some recommended classes for a physical analogue audio connector. These classes are intended to be referenced by OMTP operators in their Terminal requirements for Terminal vendors. They are also intended to act as technical guidelines for companies producing the audio local connectivity related platforms and component technologies

1.2 BUSINESS RATIONALE

Many users do not use the analogue audio output facilities in Terminals because of cost and compatibility issues with audio Headsets. In addition, a typical Terminal portfolio of an operator consists of dozens of Terminals, complemented with a large number of different peripherals such as Headsets for voice calls, car kits, Headphones for music, external speakers, etc. The variety of different peripherals is necessary due to the different physical connectors used in the Terminals. This fragmentation creates unnecessary cost for the whole value chain, limits the freedom of selection of an end user, and restricts competition by creating barriers of market entry.

Reaching an industry agreement on standard analogue audio connectivity solutions, whilst still leaving room for innovation, may streamline the whole value chain and provide end users with a larger choice of the most popular peripherals such as Headsets and Headphones. They will also be able to use their legacy home entertainment and computer equipment. This also may create a new market opportunity for peripheral vendors, which may benefit the end users and support convergence-related operator business cases such as music delivery.

1.3 INTENDED AUDIENCE

These recommendations are intended to be referenced by OMTP operators in their Terminal requirement specifications and as technical guidelines for Terminal vendors and companies producing the audio local connectivity related platforms and component technologies.

1.4 CONVENTIONS

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in RFC2119 [1].

^{© 2007} OMTP Ltd. All rights reserved. No part of this document may be reproduced or transmitted in any form or by any means without prior written permission from OMTP Ltd.

- OM TP OPEN MOBILE TERMINAL BLATEODAL
- MUST: This word, or the terms "REQUIRED" or "SHALL", mean that the definition is an absolute requirement of the specification.
- MUST NOT: This phrase, or the phrase "SHALL NOT", mean that the definition is an absolute prohibition of the specification.
- SHOULD: This word, or the adjective "RECOMMENDED", mean that there may exist valid reasons in particular circumstances to ignore a particular item, but the full implications must be understood and carefully weighed before choosing a different course.
- SHOULD NOT: This phrase, or the phrase "NOT RECOMMENDED" mean that there may exist valid reasons in particular circumstances when the particular behaviour is acceptable or even useful, but the full implications should be understood and the case carefully weighed before implementing any behaviour described with this label.
- MAY: This word, or the adjective "OPTIONAL", mean that an item is truly optional. One vendor may choose to include the item because a particular marketplace requires it or because the vendor feels that it enhances the product while another vendor may omit the same item. An implementation which does not include a particular option MUST be prepared to interoperate with another implementation which does include the option, though perhaps with reduced functionality. In the same vein an implementation which does include a particular option MUST be prepared to interoperate with another implementation which does not include the option (except, of course, for the feature the option provides.)

The requirements within this document are uniquely identified using the following format:

LC-####, where:

- LC stands for Local Connectivity
- #### is a number uniquely identifying the requirement

^{© 2007} OMTP Ltd. All rights reserved. No part of this document may be reproduced or transmitted in any form or by any means without prior written permission from OMTP Ltd.





Audio connectivity in the mobile Terminal can be divided in both analogue and digital and into wired and wireless. This document describes classes for the wired analogue connectivity. The goal of these requirements is to guarantee high quality Headset (voice and video call) and audio listening experience.

Wired audio connectivity consists of a connector in the mobile Terminal that has mechanical and electrical characteristics.

- Mechanical characteristics refer to the material, dimensions, and pinout of the connectors
- Electrical characteristics refer to the electrical compatibility in the connectors

3 USE CASES



3.1 HANDS FREE HEADSET COMPATIBILITY

Roger buys a generic hands free Headset, which can be used with any compliant mobile Terminal available in the marketplace. If he prefers an advanced Headset with latest functionality, he can buy one from the product offering of the particular Terminal manufacturer. This advanced Headset will work with Terminals from other Terminal manufacturers as a basic Headset

3.2 Music connectivity

Barbara can play music, radio, or other audio content from any compliant mobile Terminal through old Headphones she bought for the previous portable music Terminal. In some cases, an adapter may be needed. The old Headphones have no microphone, but the Headphones work for audio, and there is no need to buy another set of Headphones for the mobile Terminal.

3.3 CONNECTIVITY TO COMPLEMENTARY AUDIO SYSTEMS

Mike can play music, radio, or other audio content with the existing active loudspeakers he bought for an old PC from any compliant mobile Terminal with no problems. In some cases, a mechanical adapter may be needed.

Mike can play music, radio, or other audio content from any compliant mobile Terminal through his existing home stereo set or computer. In some cases, an adapter may be needed.

^{© 2007} OMTP Ltd. All rights reserved. No part of this document may be reproduced or transmitted in any form or by any means without prior written permission from OMTP Ltd.

4 AUDIO CONNECTIVITY REQUIREMENTS



In this chapter, requirements related to the basic standards support are listed. The mechanical characteristics of the connector are divided into OMTP classes. Other recommendations are common for all classes.

4.1 MECHANICAL

The mechanical characteristics are divided into classes defined below. These classes may be implemented either in the UE or via an adapter that can be attached to the UE.

Class OMTP ConA1

REQ. ID	REQUIREMENT
LC-0010	The small-sized (3.5 mm) audio jack mechanical size SHALL be used as defined in EAIJ RC-5325A [2]. It SHALL support the small-sized (3.5 mm) audio plug as defined in EAIJ RC-5325A [2].
	Note: The English translation of the standard [2] is to be the final authority related the recommendations in this OMTP document

Class OMTP ConA2

REQ. ID	REQUIREMENT	
LC-0020	The very-small-sized (2.5 mm) audio jack mechanical size SHALL be used as defined in EAIJ RC-5325A [2]. It SHALL support the very-small-sized (2.5 mm) audio plug as defined in EAIJ RC-5325A [2].	
	Note:,The English translation of the standard [2] is to be the final authority related the recommendations in this OMTP document.	

4.2 PINOUT

The correct pinout order is required to support the compatibility of the connector with legacy consumer equipment such as Headsets, stereo sets, and loudspeakers. Note that signal input (from microphone) is always mono. The pinout is common for classes OMTP ConA1 and OMTP ConA2.

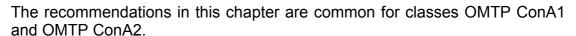
^{© 2007} OMTP Ltd. All rights reserved. No part of this document may be reproduced or transmitted in any form or by any means without prior written permission from OMTP Ltd.



D I-	
REQ. ID	REQUIREMENT
LC-0030	If a plug is inserted to a Terminal producing analogue mono audio output through an OMTP classified jack, the Terminal SHALL support the pinout order described in the figure below 1. Mono audio 2. Mono audio 3. MIC INPUT 4 GND
	5 GND
LC-0040	If a plug is inserted to a Terminal producing analogue stereo audio output through an OMTP classified jack, the Terminal SHALL support the pinout order described in the figure below
	1 Laudio
	1. L audio 2. R audio
	3. MIC INPUT
	4 GND
	5 GND

^{© 2007} OMTP Ltd. All rights reserved. No part of this document may be reproduced or transmitted in any form or by any means without prior written permission from OMTP Ltd.

4.3 ELECTRICAL





Audio out: line out (high impedance)

REQ. ID	REQUIREMENT	
1.0.0050	The UE SHALL fulfil the specifications for electrical characteristics of the standard publication BS EN 50049-1:1998, sections Audio output A and B (Page 4). [3]	
LC-0050	Note: The contact number in the standard [3] is a part of mechanical SCART definition and is not applicable to this requirement.	

Audio out: Headset (low impedance)

REQ. ID	REQUIREMENT
LC-0060	The UE SHALL fulfil the specifications for electrical characteristics of the standard publication EN 50332-2:2003 [5]

Audio in: Microphone

As there are no applicable standards, audio in electrical characteristics for the microphone signal of a Headset are defined below.

REQ. ID	REQUIREMENT		
	The electrical characteristics of the audio Terminal of the Terminal SHALL operate within the values stated below:		
	Bias Current Min 100 μA Max 500 μA		
LC-0070	(Voltage of 2.1V generated over microphone component with serial pull up resistor value between 1.90 k Ω and 2.2 k Ω)		
	Usage sensitivity Min -62 dBV		
	The measurement of the electrical characteristics SHALL be done in accordance with the standard publication IEEE Std 269-2002 [4]		

^{© 2007} OMTP Ltd. All rights reserved. No part of this document may be reproduced or transmitted in any form or by any means without prior written permission from OMTP Ltd.



REQ. ID	REQUIREMENT		
LC-0080	Informal introduction: Some Headsets have a send/end button for submitting the Send/End signal to the Terminal, in which case the signal is submitted through the MIC INPUT pin as described in LCAUD-0030 and LCAUD-0040. The Terminal SHOULD support the send/end button functionality assuming that electrical interfaces of the Headset are in line with the figure below Connector HSMIC HSGND HSEARLHR Connector HSMIC HOUSING And the resistance to GND less than 100 Ω.		
	Note: A typical test value for resistance to GND is 22 Ω		
LC-0090	The input impedance of a Terminal accessory microphone connector SHALL be more than 4kΩ@100Hz		

^{© 2007} OMTP Ltd. All rights reserved. No part of this document may be reproduced or transmitted in any form or by any means without prior written permission from OMTP Ltd.

5 FURTHER WORK



The OMTP Local Connectivity task will continue with Phase 2: Data connectivity.

Ohm



ABBREVIATION	DESCRIPTION	
Α	Ampere	
BS	British Standards	
DBV	Decibel Volt	
EAIJ	Electronic Industries Association of Japan	
EN	European Norm	
GND	Ground	
IEEE	Institute of Electrical and Electronics Engineers	
JIS	Japanese Industrial Standard	
К	Kilo (1000x)	
MIC	Microphone	
NC	Not Connected	
ОМТР	Open Mobile Terminal Platform	
PC	Personal Computer	
UE	User Equipment	



^{© 2007} OMTP Ltd. All rights reserved. No part of this document may be reproduced or transmitted in any form or by any means without prior written permission from OMTP Ltd.



7 DEFINITION OF TERMS

TERM	DESCRIPTION	
HEADSET	A hands free Headset consisting of a microphone, an optional send/end button, and one or two earpieces with speakers, and a connector for attaching it to a Terminal. A two-earpiece Headset can have mono or stereo audio output functionality. A Headset may have additional functionalities	
HEADPHONES	Headphones normally consist of two earpieces with speakers, and a connector attaching it to a consumer electronics music device. Frequently with 3,5mm stereo audio plug connector. Used for example with portable music devices, such as mp3 players and similar. No microphone	
TERMINAL	Used as an alternative term for a cellular telephone or handset.	



8 REFERENCED DOCUMENTS

No.	DOCUMENT	AUTHOR	DATE
1	RFC 2119 - Key words for use in RFCs to Indicate Requirement Levels	IETF	
2	EIAJ RC-5325A 4-Pole miniature concentric plugs and jacks 1993.05, 2004.04	JEITA	April 2004
3	BS EN 50049-1:1998 (BS 6552:1998) "Domestic and similar electronic equipment interconnection requirements: Peritelevision connector", ICS 31.220.10;33.160.40	BS	August 2004
4	IEEE Standard 269 [™] -2002, "IEEE Standard Methods for Measuring Transmission Performance of Analog and Digital Telephone Sets, Handsets, and Headsets", ISBN 0-7381-3477-5/ISBN 0-7381-3478-3, SH95056/SS95056	IEEE	2002
5	EN 50332-2 2003 "Sound system equipment. Headphones and earphones associated with portable audio equipment. Matching of sets with headphones" ISBN 0-580-43749-3	BS	2003

----- END OF DOCUMENT ------

^{© 2007} OMTP Ltd. All rights reserved. No part of this document may be reproduced or transmitted in any form or by any means without prior written permission from OMTP Ltd.