OMTP

LOCAL CONNECTIVITY: WIRED ANALOGUE AUDIO

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CONTENTS

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].

- 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

2 LOCAL CONNECTIVITY: AUDIO CONNECTORS

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.

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

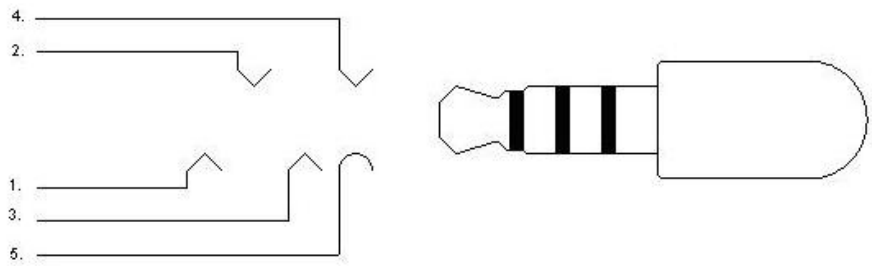
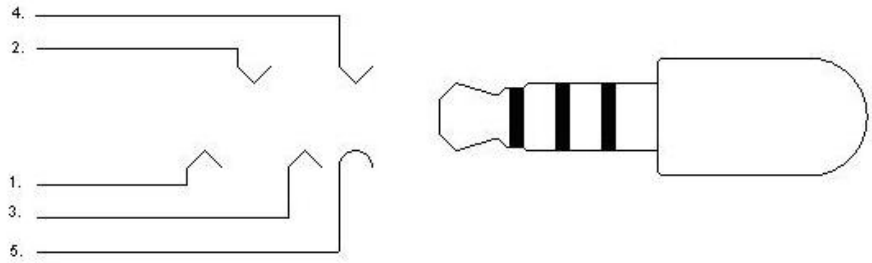
REQ. ID	REQUIREMENT
LC-0010	The small-sized (3.5 mm) audio jack mechanical size SHALL be used as defined in EAIJ RC-5325A [2]. It SHALL support the small-sized (3.5 mm) audio plug as defined in EAIJ RC-5325A [2]. *Note: The English translation of the standard [2] is to be the final authority related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

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. L audio 2. R audio 3. MIC INPUT 4 GND 5 GND

4.3 ELECTRICAL

The recommendations in this chapter are common for classes OMTP ConA1 and OMTP ConA2.

Audio out: line out (high impedance)

REQ. ID	REQUIREMENT
LC-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] *Note: The contact number in the standard [3] is a part of mechanical SCART definition and is not applicable to this requirement.*

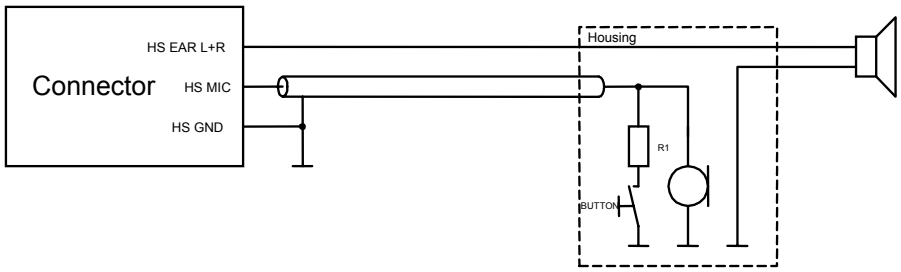
Audio out: Headset (low impedance)

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
LC-0070	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 (Voltage of 2.1V generated over microphone component with serial pull up resistor value between 1.90 kΩ and 2.2 kΩ) 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]

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  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

5 FURTHER WORK

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

6 ABBREVIATIONS

ABBREVIATION	DESCRIPTION
A	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
K	Kilo (1000x)
MIC	Microphone
NC	Not Connected
OMTP	Open Mobile Terminal Platform
PC	Personal Computer
UE	User Equipment
Ω	Ohm

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

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