User's Manual

OMX Media Component

User's Manual Dolby(R) Digital Decoder Part

Renesas Electronics
www.renesas.com

Rev.1.00 Oct. 10, 2014

Notice

1. Descriptions of circuits, software and other related information in this document are provided only to illustrate the operation of semiconductor products and application examples. You are fully responsible for the incorporation of these circuits, software, and information in the design of your equipment. Renesas Electronics assumes no responsibility for any losses incurred by you or third parties arising from the use of these circuits, software, or information.

2. Renesas Electronics has used reasonable care in preparing the information included in this document, but Renesas Electronics does not warrant that such information is error free. Renesas Electronics assumes no liability whatsoever for any damages incurred by you resulting from errors in or omissions from the information included herein.

3. Renesas Electronics does not assume any liability for infringement of patents, copyrights, or other intellectual property rights of third parties by or arising from the use of Renesas Electronics products or technical information described in this document. No license, express, implied or otherwise, is granted hereby under any patents, copyrights or other intellectual property rights of Renesas Electronics or others.

4. You should not alter, modify, copy, or otherwise misappropriate any Renesas Electronics product, whether in whole or in part. Renesas Electronics assumes no responsibility for any losses incurred by you or third parties arising from such alteration, modification, copy or otherwise misappropriation of Renesas Electronics product.

5. Renesas Electronics products are classified according to the following two quality grades: “Standard” and “High Quality”. The recommended applications for each Renesas Electronics product depends on the product’s quality grade, as indicated below.

“Standard”: Computers; office equipment; communications equipment; test and measurement equipment; audio and visual equipment; home electronic appliances; machine tools; personal electronic equipment; and industrial robots etc.

“High Quality”: Transportation equipment (automobiles, trains, ships, etc.); traffic control systems; anti-disaster systems; anti-crime systems; and safety equipment etc.

Renesas Electronics products are neither intended nor authorized for use in products or systems that may pose a direct threat to human life or bodily injury (artificial life support devices or systems, surgical implantations etc.), or may cause serious property damages (nuclear reactor control systems, military equipment etc.). You must check the quality grade of each Renesas Electronics product before using it in a particular application. You may not use any Renesas Electronics product for any application for which it is not intended. Renesas Electronics shall not be in any way liable for any damages or losses incurred by you or third parties arising from the use of any Renesas Electronics product for which the product is not intended by Renesas Electronics.

6. You should use the Renesas Electronics products described in this document within the range specified by Renesas Electronics, especially with respect to the maximum rating, operating supply voltage range, movement power voltage range, heat radiation characteristics, installation and other product characteristics. Renesas Electronics shall have no liability for malfunctions or damages arising out of the use of Renesas Electronics products beyond such specified ranges.

7. Although Renesas Electronics endeavors to improve the quality and reliability of its products, semiconductor products have specific characteristics such as the occurrence of failure at a certain rate and malfunctions under certain use conditions. Further, Renesas Electronics products are not subject to radiation resistance design. Please be sure to implement safety measures to guard them against the possibility of physical injury, and injury or damage caused by fire in the event of the failure of a Renesas Electronics product, such as safety design for hardware and software including but not limited to redundancy, fire control and malfunction prevention, appropriate treatment for aging degradation or any other appropriate measures. Because the evaluation of microcomputer software alone is very difficult, please evaluate the safety of the final products or systems manufactured by you .

8. Please contact a Renesas Electronics sales office for details as to environmental matters such as the environmental compatibility of each Renesas Electronics product. Please use Renesas Electronics products in compliance with all applicable laws and regulations that regulate the inclusion or use of controlled substances, including without limitation, the EU RoHS Directive. Renesas Electronics assumes no liability for damages or losses occurring as a result of your noncompliance with applicable laws and regulations.

9. Renesas Electronics products and technology may not be used for or incorporated into any products or systems whose manufacture, use, or sale is prohibited under any applicable domestic or foreign laws or regulations. You should not use Renesas Electronics products or technology described in this document for any purpose relating to military applications or use by the military, including but not limited to the development of weapons of mass destruction. When exporting the Renesas Electronics products or technology described in this document, you should comply with the applicable export control laws and regulations and follow the procedures required by such laws and regulations.

10. It is the responsibility of the buyer or distributor of Renesas Electronics products, who distributes, disposes of, or otherwise places the product with a third party, to notify such third party in advance of the contents and conditions set forth in this document, Renesas Electronics assumes no responsibility for any losses incurred by you or third parties as a result of unauthorized use of Renesas Electronics products.

12. Please contact a Renesas Electronics sales office if you have any questions regarding the information contained in this document or Renesas Electronics products, or if you have any other inquiries.

(Note 1) “Renesas Electronics” as used in this document means Renesas Electronics Corporation and also includes its majority-owned subsidiaries.

(Note 2) “Renesas Electronics product(s)” means any product developed or manufactured by or for Renesas Electronics.

Trademarks

- Linux® is the registered trademark of Linus Torvalds in the United States and other countries.
- ARM® is a registered trademark or trademark of ARM Ltd. in the United States and other countries.
- Windows and Windows Media are registered trademarks of Microsoft Corporation in the United States and other countries.
- Android is a trademark of Google Inc. Use of this trademark is subject to Google permissions.
- All other company names and product names mentioned in this manual are registered trademarks or trademarks of their respective companies.
- The registered trademark symbol (®) and trademark symbol (™) are omitted in this manual.

- Table of Contents -

- Figures -

- Tables -

1. Overview

1.1. Overview of This Document

This document is the User's Manual for the OMX Media Component and specifications of the Dolby(R) Digital Decoder Media Component are described.
Please read this document with related document [1] and [2].

1.2. Overview of Dolby(R) Digital Decoder Media Component and Scope of This Document

Figure 1-1shows the software configuration of the Dolby(R) Digital Decoder Media Component and scope. The Dolby(R) Digital Decoder Media Component consists of the OMX Media Component Common Library which provides common functions of OpenMAX IL, the OMX Media Component Audio Common Library which provides common functions of audio processing, and the OMX Media Component Dolby(R) Digital Decoder Library which realizes functions of Dolby(R) Digital Decoder. The OMX Media Component Dolby(R) Digital Decoder Library controls ARM 5.1ch Dolby(R) Digital Decode Middleware and realizes codec processing.

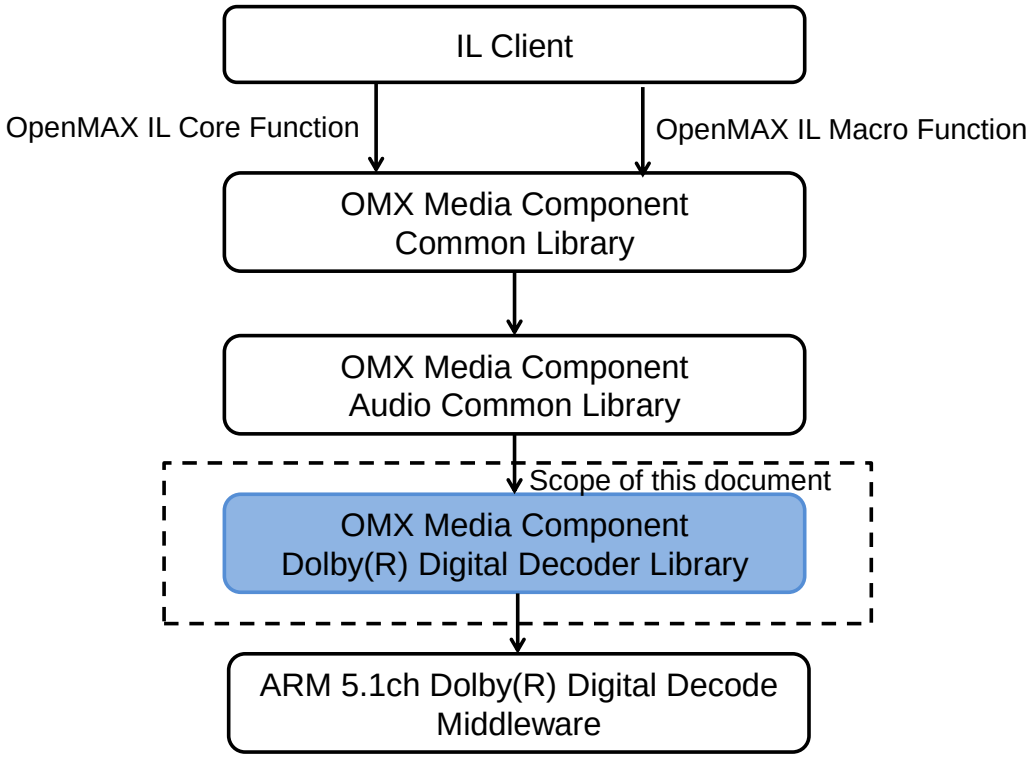

Figure 1-1 Software Configuration of Dolby(R) Digital Decoder Media Component and Scope

1.3. Related Documents

Table 1-1 shows the reference documents and related documents.

Table 1-1 List of Related Documents

No	Document Name	Description
[1]	OMX Media Component User's Manual Common Part	
[2]	OMX Media Component User's Manual Audio Common Part	
[3]	OpenMAX Integration Layer Application Programming Interface Specification Version 1.1.2, September 1, 2008	http://www.khronos.org/registry/omxil/specs/OpenMAX_IL_1_1_2_Specification.pdf

1.4. Terminology

Table 1-2 shows the terminology used in this document.

Table 1-2 Terminology

Term	Abbreviation	Description
Audio Port Base	APB	The base value of the port index of the Audio Media Component. The port index values of the input and output ports are obtained by adding offset values to this base value.
OpenMAX IL	-	Open API specified by the Khronos Group. It standardizes accesses to primitive media processing which is commonly used in graphics, audio, and image libraries.
Component	-	Refers to a component that is defined in OpenMAX IL Specification.
Media Component	MC	A component that performs multimedia processing. It corresponds to the Component that is defined in OpenMAX IL.
IL Client	-	Refers to software that uses functions of OpenMAX IL Core and Component.

1.5. Role Name and Component Name

Table 1-3 shows the role name and component name of Dolby(R) Digital Decoder Media Component.

Table 1-3 Role Name and Component Name

Role Name	Component Name
audio_decoder.dd	OMX.RENESAS.AUDIO.DECODER.DD

2. Functions

The Dolby(R) Digital Decoder Media Component is the component that provided functions to decode data compressed by Dolby(R) Digital (Dolby AC-3) standard.

The Dolby(R) Digital Decoder Media Component performs decode processing when compressed data is stored in the input buffer and stores resulted linear PCM data to the output buffer.

2.1. Function Details

2.1.1. Decode Function

The supported standards and functions by the Dolby(R) Digital Decoder Media Component are shown as below.

Table 2-1 Supported Standards and Functions

Coding Method	ATSC Standard: Digital Audio Compression Standard (AC-3), Advanced Television System Committee, Washington, D.C. Doc. A/52, Dec. 20, 1995 Dolby Laboratories: Annex D (Informative) Dolby Digital (AC-3) Extended Bits Syntax, Version 1.1
Input Format	Dolby(R) Digital bit stream (Dolby(R) Digital Plus bit stream is not supported)
Input Channel	1 channel : 1/0(C) 2 channels : 2/0(L,R) , 1+1(dual-monaural) 3 channels : 3/0(L,C,R) , 2/1(L,R,S) 4 channels : 3/1(L,C,R,S) , 2/2(L,R,Ls,Rs) 5 channels : 3/2(L,C,R,Ls,Rs) LFE channel : ON or OFF (Note 1)
Input Sampling Frequency	32 / 44.1 / 48 kHz
Input Bit Rate	32 / 41 /48 / 56 / 64 / 80 / 96 / 112 / 128 / 160 / 192 / 224 / 256 / 320 / 384 / 448 / 512 / 576 / 640 kbps
Output Format	16 bit linear PCM (channel interleaved format)
Output Channel	Maximum 5.1 channels (Down Mix is supported)
Output Sampling Frequency	Same as input sampling frequency
Number of samples per frame	1536 samples

(Note 1) “/” denotes the number of channels for the front and rear speakers.

2.1.2. Notification Function of Port Information Change

The Dolby(R) Digital Decoder Media Component sends event when the information of “Output Sampling Frequency”, “Output Channel Number”, and “Output Channel Mapping” is changed. Please refer to section 7, for details.

2.2. Port

The Dolby(R) Digital Decoder Media Component has one input port and one output port.

The input port has input buffers to store compressed data, and the output port has output buffers to store PCM data.

Table 2-2 Ports of Dolby(R) Digital Decoder Media Component

Component	Port Index	Type
Dolby(R) Digital Decoder Media Component	APB+0	Input Port
	APB+1	Output Port

3. I/O Data Format

3.1. Buffer Payload

Figure 3-1 shows the data storage format of input buffers for Dolby(R) Digital Decoder Media Component. "fn" in the figure denotes the sequence number (frame number) of compressed data. Compressed data is input to Dolby(R) Digital Decoder Media Component in frame units. An arbitrary number of frames can be stored in a single input buffer if data is input in frame units. However, one frame data cannot be split into two or more input buffers.

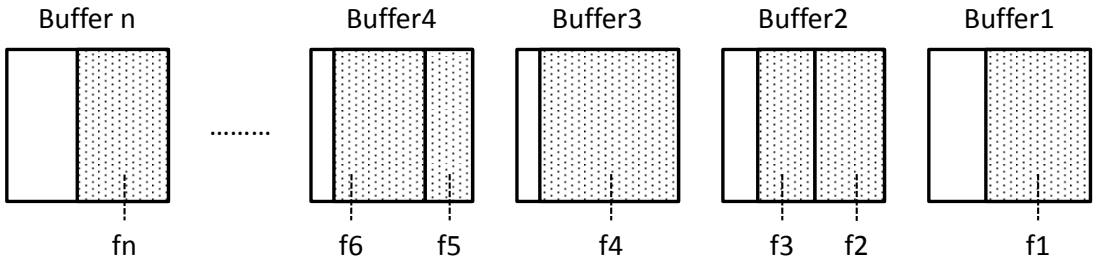

Figure 3-1 Data Storage Format of Input Buffers

Figure 3-2 and Figure 3-3 show the data storage format of output buffers for Dolby(R) Digital Decoder Media Component. PCM data decoded by Dolby(R) Digital Decoder Media Component can be stored in the output buffers in one frame unit or sequentially. However, equal-time linear PCM samples (for all channels) are stored to same buffer.

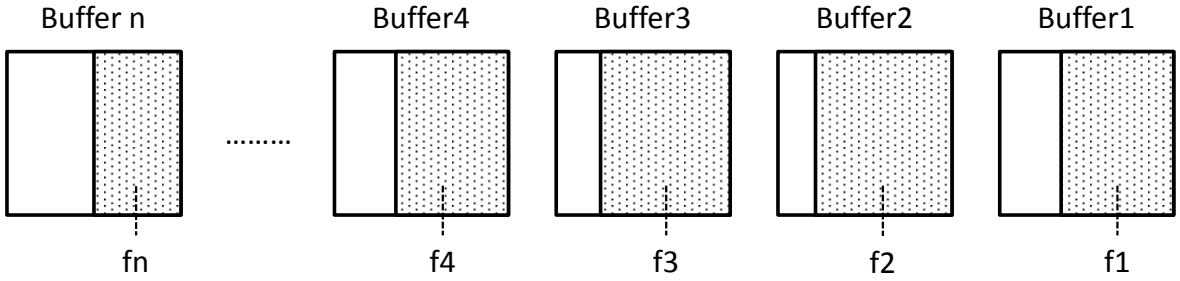

Figure 3-2 Data Storage Format of Output Buffer (1 Frame Unit)

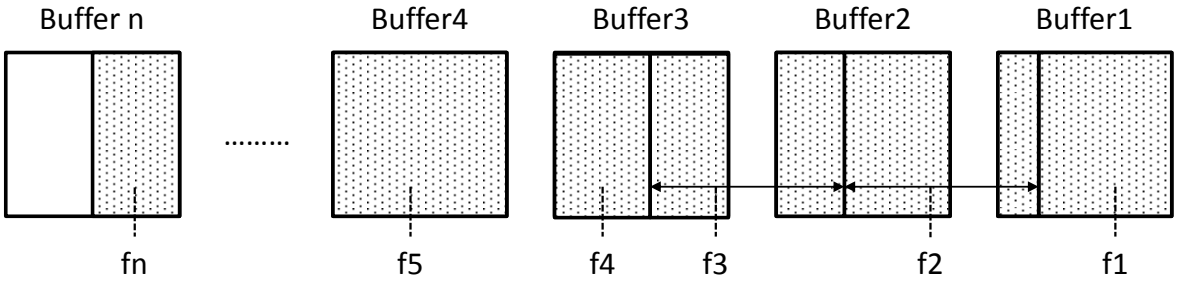

Figure 3-3 Data Storage Format of Output Buffer (Continuation)

3.2. Data Format of Input Buffer

Figure 3-4 shows input buffer format. A stream data is stored to the input buffer and the data size is set to nFilledLen in the OMX_BUFFERHEADERTYPE structure.

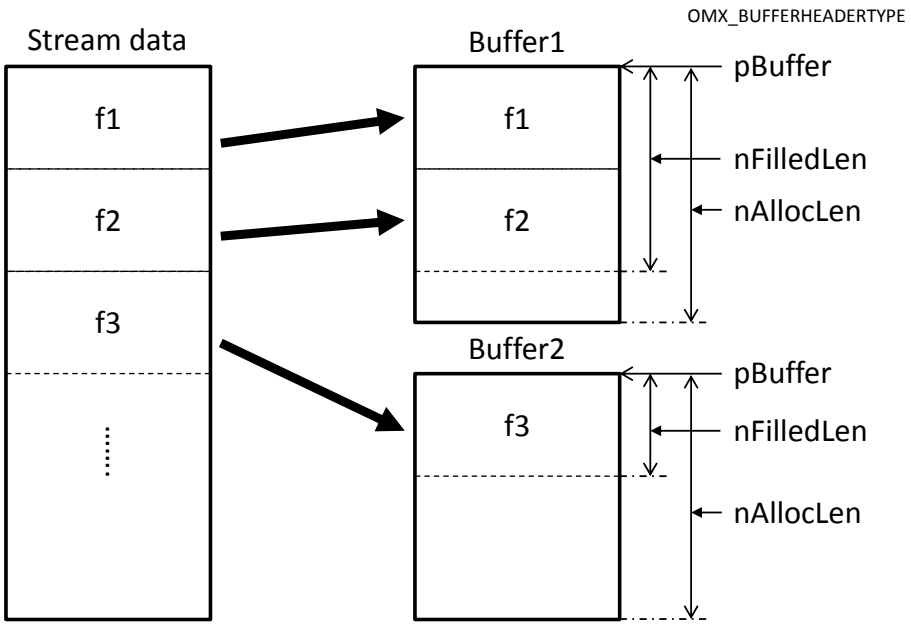

Figure 3-4 Data Format of Input Buffer

Figure 3-5 shows Input data format. A little-endian stream data is stored to the input buffer.

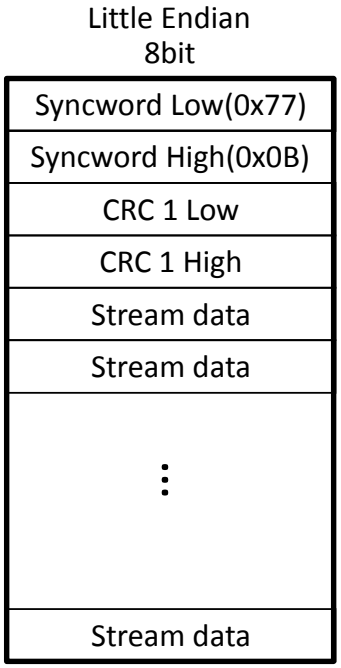

Figure 3-5 Input data Format

3.3. Data Format of Output Buffer

Dolby(R) Digital Decoder Media Component stores the volume of output data specified by nFilledLen in the OMX_BUFFERHEADERTYPE structure from the address specified by a member of that structure as shown in Figure 3-6.

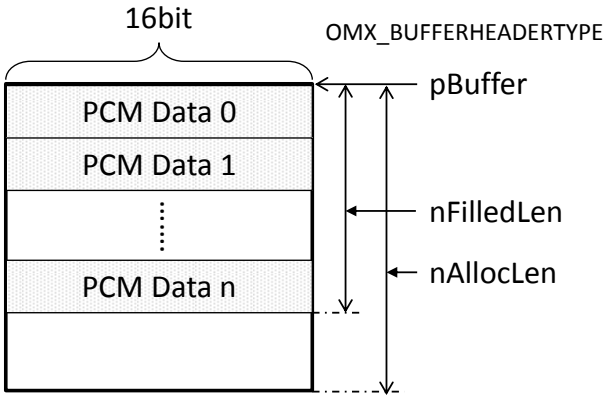

Figure 3-6 Data Format of Output Buffer

In Dolby(R) Digital Decoder Media Component, layout of PCM data is different for each output channel. Figure 3-7 shows formats of each output channel. When data from 3 to 5.1 channels or LFE channels is outputs, the output format is 6 channels and silent data is stored for void channel.

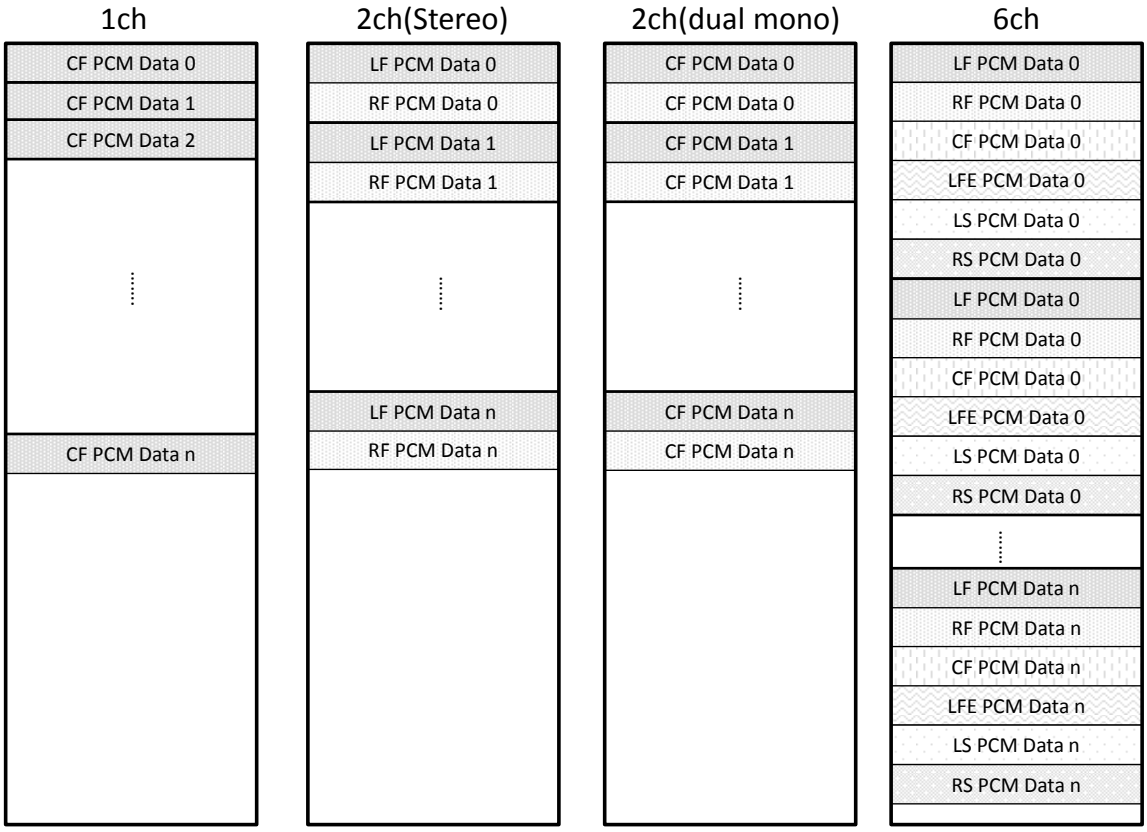

Figure 3-7 Data Format of each Output Channel

Table 3-1 shows relation of output PCM data channels, Input stream channel, the channel setting (eChannelMode in the OMXR_MC_AUDIO_PARAM_DDTYPE structure) and LFE setting (bLfeMode in the OMXR_MC_AUDIO_PARAM_DDTYPE structure).

Table 3-1 Relation of Channel Setting and Output Channels

setting \ Input Stream channel		1	2/0	1+1	3/0	2/1	3/1	2/2	3/2
1/0	**LFE off**	1ch	1ch	1ch	1ch	1ch	1ch	1ch	1ch
	LFE on	6ch (1/0)	6ch (1/0)	6ch (1/0)	6ch (1/0)	6ch (1/0)	6ch (1/0)	6ch (1/0)	6ch (1/0)
2/0	**LFE off**	2ch (stereo)	2ch (stereo)	2ch (dual mono)	2ch (stereo)	2ch (stereo)	2ch (stereo)	2ch (stereo)	2ch (stereo)
	LFE on	6ch (2/0)	6ch (2/0)	6ch (1+1)	6ch (2/0)	6ch (2/0)	6ch (2/0)	6ch (2/0)	6ch (2/0)
3/2	**LFE off**	6ch (1/0)	6ch (2/0)	6ch (1+1)	6ch (3/0)	6ch (2/2) (Note 1)	6ch (3/2) (Note 1)	6ch (2/2)	6ch (3/2)
	LFE on	6ch (1/0)	6ch (2/0)	6ch (1+1)	6ch (3/0)	6ch (2/2)	6ch (3/2)	6ch (2/2)	6ch (3/2)

(Note 1) The center surround of 2/1 and 3/1 is separated left/right surround.

When a LEF setting is on and LFE channel is contained in the input stream, LFE channel is output.

4. API Reference

Please refer to the related document [2].

5. Indexes

5.1. Standard Indexes of Dolby(R) Digital Decoder Media Component

Table 5-1 shows the list of standard indexes that are available for Dolby(R) Digital Decoder Media Component.

Table 5-1 List of Indexes available for Dolby(R) Digital Decoder Media Component

Index	Corresponding Strucure Name
Description	
OMX_IndexParamAudioInit	OMX_PORT_PARAM_TYPE Structure
Please refer to the related document [1].	
OMX_IndexParamVideoInit	OMX_PORT_PARAM_TYPE Structure
Please refer to the related document [1].	
OMX_IndexParamImageInit	OMX_PORT_PARAM_TYPE Structure
Please refer to the related document [1].	
OMX_IndexParamOtherInit	OMX_PORT_PARAM_TYPE Structure
Please refer to the related document [1].	
OMX_IndexParamStandardComponentRole	OMX_PARAM_COMPONENTROLETYPE Structure
Please refer to the related document [1].	
OMX_IndexParamCompBufferSupplier	OMX_PARAM_BUFFERSUPPLIERTYPE Structure
Please refer to the related document [1].	
OMX_IndexParamPortDefinition	OMX_PORTDEFINITIONTYPE Structure
Please refer to the related document [1] and [2].	
OMX_IndexParamAudioPortFormat	OMX_AUDIO_PARAM_PORTFORMATTYPE Structure
Please refer to the related document [2].	
OMX_IndexParamAudioPcm	OMX_AUDIO_PARAM_PCMMODETYPE Structure
To set or get information regarding PCM.	

5.2. Expanded Indexes of Dolby(R) Digital Decoder Media Component

Table 5-2 shows the list of expanded indexes that are available for Dolby(R) Digital Decoder Media Component.

Table 5-2 List of Expanded Indexes available for Dolby(R) Digital Decoder Media Component

Index (Expanded Index Name)	Corresponding Strucure Name
Description	
OMXR_MC_IndexParamAudioOutputUnit (OMX.RENESAS.INDEX.PARAM.AUDIO.OUTPUTUNIT)	OMXR_MC_AUDIO_PARAM_OUTPUTUNITTYPE Structure
Please refer to the related document [2].	
OMXR_MC_IndexParamAudioPortSettingMask (OMX.RENESAS.INDEX.PARAM.AUDIO. PORTSETTINGSEVENTMASK)	OMXR_MC_AUDIO_PARAM_PORTSETTINGSEVENTMASK TYPE Structure
Please refer to the related document [2].	
OMXR_MC_IndexParamAudioDd (OMX.RENESAS.INDEX.PARAM.AUDIO.DD)	OMXR_MC_AUDIO_PARAM_DDTYPE Structure
Please refer to the section 6.3	

5.3. Indexes Specified by OpenMAX IL Macro Functions

Table 5-3 shows indexes which can be specified by OpenMAX IL Macro functions and available port index for Dolby(R) Digital Decoder Media Component.

Table 5-3 Indexes Specified by OpenMAX IL Macro Functions

Index	Get/SetParameter		Get/SetConfig		Port Index	
	Get	Set	Get	Set	APB+0	APB+1
OMX_IndexParamAudioInit	x	x	-	-	-	-
OMX_IndexParamVideoInit	x	x	-	-	-	-
OMX_IndexParamImageInit	x	x	-	-	-	-
OMX_IndexParamOtherInit	x	x	-	-	-	-
OMX_IndexParamStandardComponentRole	x	x	-	-	-	-
OMX_IndexParamCompBufferSupplier	x	x	-	-	x	x
OMX_IndexParamPortDefinition	x	x	-	-	x	x
OMX_IndexParamAudioPortFormat	x	x	-	-	x	x
OMXR_MC_IndexParamAudioDd	x	x	-	-	x	-
OMX_IndexParamAudioPcm	x	x	-	-	-	x
OMXR_MC_IndexParamAudioOutputUnit	x	x	-	-	-	x
OMXR_MC_IndexParamAudioPortSettingMask	x	x	-	-	-	x

x : Effective
- : Ineffective

6. Structures

Table 6-1 shows the list of structures of Dolby(R) Digital Decoder Media Component.

Table 6-1 Structures of Dolby(R) Digital Decoder Media Component

Structure Name	Reference
OMX_AUDIO_PORTDEFINITIONTYPE	Section 6.1
OMX_PARAM_COMPONENTROLETYPE	Related Document [1]
OMX_PARAM_BUFFERSUPPLIERTYPE	Related Document [1]
OMX_AUDIO_PARAM_PORTFORMATTYPE	Section 6.2
OMXR_MC_AUDIO_PARAM_DDTYPE	Section 6.3
OMX_AUDIO_PARAM_PCMMODETYPE	Section 6.4
OMXR_MC_AUDIO_PARAM_OUTPUT_UNITTYPE	Related Document [2]
OMXR_MC_AUDIO_PARAM_PORTSETTINGSEVENTMASKTYPE	Related Document [2]

Given below is an explanation of how to interpret the member of the structures described in this section.

- ✓ Description of a member of a structure corresponded to index

[Member]

Member Name	Get	Set
Indicates the member name	Indicates the attribute of the member specified in the OMX_GetParameter () or OMX_GetConfig () function. If "R" is written, the value of this member can be obtained. If "W" is written, please specify a value in this member.	Indicates the attributes of the member specified in the OMX_SetParameter () or OMX_SetConfig () function. If "W" is written, please specify a value in this member. If “-” is written, the value of this member is ignored. Any value specified in this member is not reflected.

6.1. OMX_AUDIO_PORTDEFINITIONTYPE

[Structure] Please refer to section 4.1.5 in the related document [3].

[Function] Please refer to section 4.1.5 in the related document [3].

[Members]

Member Name	Get	Set
cMIMEType	R	-
pNativeRender	R	-
bFlagErrorConcealment	R	-
eEncoding	R	-

[Details]

cMIMEType

Configurable value	-
Acquirable value	NULL
Initial value	NULL
Remarks	Not supported.

pNativeRender

Configurable value	-
Acquirable value	NULL
Initial value	NULL
Remarks	Not supported.

bFlagErrorConcealment

Configurable value	-
Acquirable value	OMX_FLASE
Initial value	OMX_FLASE
Remarks	Not supported.

eEncoding

Configurable value	-	
Acquirable value	**nPortIndex**	**Value**
	APB+0	OMXR_MC_AUDIO_CodingDD
	APB+1	OMX_AUDIO_CodingPCM
Initial value	**nPortIndex**	**Value**
	APB+0	OMXR_MC_AUDIO_CodingDD
	APB+1	OMX_AUDIO_CodingPCM
Remarks	-	

6.2. OMX_AUDIO_PARAM_PORTFORMATTYPE

[Structure] Please refer to section 4.1.6 in the related document [3].

[Function] Please refer to section 4.1.6 in the related document [3].

[Members]

Member Name	Get	Set
nSize	W	W
nVersion	R	-
nPortIndex	W	W
nIndex	W	-
eEncoding	R	-

[Details]

nSize

Configurable value	Specify the size (in bytes) of the OMX_AUDIO_PARAM_PORTFORMATTYPE structure.
Acquirable value	-
Initial value	-
Remarks	-

nVersion

Configurable value	-
Acquirable value	Specification version of OpenMAX IL (1.1.2).
Initial value	Specification version of OpenMAX IL (1.1.2).
Remarks	-

nPortIndex

Configurable value	APB+0 APB+1
Acquirable value	-
Initial value	-
Remarks	-

nIndex

Configurable value	**nPortIndex**	**Value**
	APB+0	0
	APB+1	0
Acquirable value	-	
Initial value	-	
Remarks	-	

eEncoding

Configurable value	-		
Acquirable value	**nPortIndex**	**nIndex**	**Value**
	APB+0	0	OMXR_MC_AUDIO_CodingDD
	APB+1	0	OMX_AUDIO_CodingPCM
Initial value	**nPortIndex**	**nIndex**	**Value**
	APB+0	0	OMXR_MC_AUDIO_CodingDD
	APB+1	0	OMX_AUDIO_CodingPCM
Remarks	-		

6.3. OMXR_MC_AUDIO_PARAM_DDTYPE

[Structure]
```
typedef struct OMXR_MC_AUDIO_PARAM_DDTYPE{
    OMX_U32                                 nSize;
    OMX_VERSIONTYPE                         nVersion;
    OMX_U32                                 nPortIndex;
    OMXR_MC_AUDIO_DD_KARAOKEMODE            eKaraokeMode;
    OMXR_MC_AUDIO_DD_COMPRESSIONMODE        eCompressionMode;
    OMXR_MC_AUDIO_DD_CHANNELMODE            eChannelMode;
    OMXR_MC_AUDIO_DD_STEREOMODE             eStereoMode;
    OMX_BOOL                                bLfeMode;
    OMXR_MC_AUDIO_DD_DUALMONOMODE           eDualMonoMode;
    OMX_U32                                 nDynamicRangeScaleFactorHi;
    OMX_U32                                 nDynamicRangeScaleFactorLow;
} OMXR_MC_AUDIO_PARAM_DDTYPE;
```

[Function] Parameter of Dolby(R) Digital decode information.

[Members]

Member Name	Get	Set
nSize	W	W
nVersion	R	-
nPortIndex	W	W
eKaraokeMode	R	W
eCompressionMode	R	W
eChannelMode	R	W
eStereoMode	R	W
bLfeMode	R	W
eDualMonoMode	R	W
nDynamicRangeScaleFactorHi	R	W
nDynamicRangeScaleFactorLow	R	W

[Details]

nSize

Configurable value	Specify the size (in bytes) of the OMXR_MC_AUDIO_PARAM_DDTYPE structure.
Acquirable value	-
Initial value	-
Remarks	-

nVersion

Configurable value	-
Acquirable value	Specification version of OpenMAX IL (1.1.2).
Initial value	Specification version of OpenMAX IL (1.1.2).
Remarks	-

nPortIndex

Configurable value	APB+0
Acquirable value	-
Initial value	-
Remarks	-

eKaraokeMode

Configurable value	OMXR_MC_AUDIO_DD_VocalNo OMXR_MC_AUDIO_DD_VocalLeft OMXR_MC_AUDIO_DD_VocalRight OMXR_MC_AUDIO_DD_VocalBoth	
Acquirable value	Setting value	
Initial value	OMXR_MC_AUDIO_DD_VocalBoth	
Remarks	**Value**	**Description**
	OMXR_MC_AUDIO_DD_VocalNo	The vocal is not reproduced
	OMXR_MC_AUDIO_DD_VocalLeft	The left side vocal (V1) is reproduced
	OMXR_MC_AUDIO_DD_VocalRight	The right side vocal (V2) is reproduced
	OMXR_MC_AUDIO_DD_VocalBoth	The both vocal (V1, v2) is reproduced

eCompressionMode

Configurable value	OMXR_MC_AUDIO_DD_NoDigitalDialogNormalization OMXR_MC_AUDIO_DD_DigitalDialogNormalization OMXR_MC_AUDIO_DD_LineOut OMXR_MC_AUDIO_DD_RF	
Acquirable value	Setting value	
Initial value	OMXR_MC_AUDIO_DD_LineOut	
Remarks	**Value**	**Description**
	OMXR_MC_AUDIO_DD_NoDigitalDialogNormalization	Custom mode (no digital dialog normalization)
	OMXR_MC_AUDIO_DD_DigitalDialogNormalization	Custom mode (digital dialog normalization)
	OMXR_MC_AUDIO_DD_LineOut	Line out mode
	OMXR_MC_AUDIO_DD_RF	RF mode

eChannelMode

Configurable value	OMXR_MC_AUDIO_DD_ChannelMode1_0 OMXR_MC_AUDIO_DD_ChannelMode2_0 OMXR_MC_AUDIO_DD_ChannelMode3_2	
Acquirable value	Setting value	
Initial value	OMXR_MC_AUDIO_DD_ChannelMode2_0	
Remarks	**Value**	**Description**
	OMXR_MC_AUDIO_DD_ChannelMode1_0	1 channel (C)
	OMXR_MC_AUDIO_DD_ChannelMode2_0	2 channels (L,R or Ch1,Ch2)
	OMXR_MC_AUDIO_DD_ChannelMode3_0	3 channels (L,C,R) (Unsupported)
	OMXR_MC_AUDIO_DD_ChannelMode2_1	3 channels (L,R,S) (Unsupported)
	OMXR_MC_AUDIO_DD_ChannelMode3_1	4 channels (L,C,R,S) (Unsupported)
	OMXR_MC_AUDIO_DD_ChannelMode2_2	4 channels (L,R,Ls,Rs) (Unsupported)
	OMXR_MC_AUDIO_DD_ChannelMode3_2	5 channels (L,C,R,Ls,Rs)
	L:L-channel, R:R-channel, C:Center channel, S: Surround channel, Rs: Surround R-channel, Ls: Surround L-channel When the eChannelMode is OMXR_MC_AUIDO_DD_ChannelMode3_2, the Output format is 6ch in Figure 3-7	

eStereoMode

Configurable value	OMXR_MC_AUDIO_DD_AutoDetect OMXR_MC_AUDIO_DD_DolbySurroundCompatible OMXR_MC_AUDIO_DD_Stereo	
Acquirable value	Setting value	
Initial value	OMXR_MC_AUDIO_DD_AutoDetect	
Remarks	**Value**	**Description**
	OMXR_MC_AUDIO_DD_AutoDetect	Auto detect mode.
	OMXR_MC_AUDIO_DD_DolbySurround Compatible	Dolby(R) Surround Compatible mode.
	OMXR_MC_AUDIO_DD_Stereo	Stereo mode
	This parameter is the setting of Down Mix specification in the case of stereo output. This parameter is used when the eChannelMode is OMXR_MC_AUDIO_DD_ChannelMode2_0.	

bLfeMode

Configurable value	OMX_TRUE OMX_FALSE	
Acquirable value	Setting value	
Initial value	OMX_FALSE	
Remarks	**Value**	**Description**
	OMX_TRUE	The LFE(Low Frequency Effects) channel is output
	OMX_FALSE	The LFE(Low Frequency Effects) channel is not output
	When the bLfeMode is OMX_TURE, the Output format is 6ch in Figure 3-7.	

eDualMonoMode

Configurable value	OMXR_MC_AUDIO_DD_DualMonoModeBoth OMXR_MC_AUDIO_DD_DualMonoModeChannel1 OMXR_MC_AUDIO_DD_DualMonoModeChannel2 OMXR_MC_AUDIO_DD_DualMonoModeMix	
Acquirable value	Setting value	
Initial value	OMXR_MC_AUDIO_DD_DualMonoModeBoth	
Remarks	**Value**	**Description**
	OMXR_MC_AUDIO_DD_DualMonoModeBoth	The channel1 and 2 is output.
	OMXR_MC_AUDIO_DD_DualMonoModeChannel1	The channel1 is output.
	OMXR_MC_AUDIO_DD_DualMonoModeChannel2	The channel2 is output.
	OMXR_MC_AUDIO_DD_DualMonoModeMix	The channel 1 and 2 is mixed.
	This parameter is used when the input stream is dual monaural.	

nDynamicRangeScaleFactorHi

Configurable value	0x00000000 - 0x7FFFFFFF
Acquirable value	Setting value
Initial value	0x00000000
Remarks	This parameter is cut scale factor of dynamic range. Set 0.0 to 1.0 as 0x00000000 to 0x7FFFFFFF Setting Value = scale factor(0.0 to 1.0) x 0x80000000 If scale factor is 1.0, Setting Value is 0x7FFFFFFF When the value is 0.0(0x00000000), completion is invalid. This parameter is not used when the eCompressionMode is OMXR_MC_AUDIO_DD_RF.

nDynamicRangeScaleFactorLow

Configurable value	0x00000000 - 0x7FFFFFFF
Acquirable value	Setting value
Initial value	0x00000000
Remarks	This parameter is boost scale factor of dynamic range. Set 0.0 to 1.0 as 0x00000000 to 0x7FFFFFFF Setting Value = scale factor(0.0 to 1.0) x 0x80000000 If scale factor is 1.0, Setting Value is 0x7FFFFFFF When the value is 0.0(0x00000000), completion is invalid. This parameter is not used when the eCompressionMode is OMXR_MC_AUDIO_DD_RF.

6.4. OMX_AUDIO_PARAM_PCMMODETYPE

[Structure] Please refer to section 4.1.7 in the related document [3].

[Function] Please refer to section 4.1.7 in the related document [3].

[Members]

Member Name	Get	Set
nSize	W	W
nVersion	R	-
nPortIndex	W	W
nChannels	R	W
eNumData	R	-
eEndian	R	-
bInterleaved	R	-
nBitPerSample	R	-
nSamplingRate	R	W
ePCMMode	R	-
eChannelMapping	R	W

[Details]

nSize

Configurable value	Specify the size (in bytes) of the OMX_AUDIO_PARAM_PCMMODETYPE structure.
Acquirable value	-
Initial value	-
Remarks	-

nVersion

Configurable value	-
Acquirable value	Specification version of OpenMAX IL (1.1.2).
Initial value	Specification version of OpenMAX IL (1.1.2).
Remarks	-

nPortIndex

Configurable value	APB+1
Acquirable value	-
Initial value	-
Remarks	-

nChannels

Configurable value	1, 2, 6
Acquirable value	Setting value or decoded result.
Initial value	2
Remarks	This value does not affect decoding process. When the LFE channel or data from 3 to 5.1 channels is output, this value is set 6.

eNumData

Configurable value	-
Acquirable value	OMX_NumericalDataSigned
Initial value	OMX_NumericalDataSigned
Remarks	Not supported.

eEndian

Configurable value	-
Acquirable value	OMX_EndianLittle
Initial value	OMX_EndianLittle
Remarks	Not supported.

bInterleaved

Configurable value	-
Acquirable value	OMX_TRUE
Initial value	OMX_TRUE
Remarks	Not supported.

nBitPerSample

Configurable value	-
Acquirable value	16
Initial value	16
Remarks	Not supported.

nSamplingRate

Configurable value	32000, 44100, 48000
Acquirable value	Setting value or decoded result.
Initial value	48000
Remarks	This value does not affect decoding process.

ePCMMode

Configurable value	-
Acquirable value	OMX_AUDIO_PCMModeLinear
Initial value	OMX_AUDIO_PCMModeLinear
Remarks	Not supported.

eChannelMapping

Configurable value	OMX_AUDIO_ChannelNone OMX_AUDIO_ChannelLF OMX_AUDIO_ChannelRF OMX_AUDIO_ChannelCF OMX_AUDIO_ChannelLFE OMX_AUDIO_ChannelLS OMX_AUDIO_ChannelRS
Acquirable value	Setting value or decoded result.
Initial value	eChannelMapping[0]= OMX_AUDIO_ChannelLF eChannelMapping[1]= OMX_AUDIO_ChannelRF
Remarks	This value does not affect decoding process. The relation among channel of input data, nChannels and eChannelMapping is shown as below.

Output Channel	nChannles	eChannelMapping					
		0	1	2	3	4	5
1ch	1	CF	-	-	-	-	-
2ch(stereo)	2	LF	RF	-	-	-	-
2ch(dual mono)	2	CF	CF	-	-	-	-
6ch(1/0)	6	None	None	CF	(LFE)	None	None
6ch(2/0)	6	LF	RF	None	(LFE)	None	None
6ch(1+1)	6	CF	CF	None	(LFE)	None	None
6ch(3/0)	6	LF	RF	CF	(LFE)	None	None
6ch(2/2)	6	LF	RF	None	(LFE)	LS	RS
6ch(3/2)	6	LF	RF	CF	(LFE)	LS	RS

6.5. Structure Members Used in a Unique Manner

Table 6-2 shows structure members used in a unique manner for Dolby(R) Digital Decoder Media Component.

Table 6-2 Structure Members Used in a Unique Manner

Structure Name	Member	Usage
OMX_BUFFERHEADERTYPE (refer to section 5.1.1 in the related document [1])	nOffset	Not supported. Specify 0.
	nTickCount	Any value can be specified to the OMX_BUFFERHEADERTYPE structure which is input by the OMX_EmptyThisbuffer( ) function. The value specified in this member is copied into a member of the OMX_BUFFERHEADERTYPE structure which is returned by the (*FillBufferDone)( ) callback function.
	nTimeStamp	Any value can be specified to the OMX_BUFFERHEADERTYPE structure which is input by the OMX_EmptyThisbuffer( ) function. The value specified in this member is used for calculating the output value of corresponding member of the OMX_BUFFERHEADERTYPE structure which is returned by the (*FillBufferDone)( ) callback function.
	nFlags	Please refer to section 6.5.1.

6.5.1. Buffer Flag (nFlags)

The buffer flag (nFlags in the OMX_BUFFERHEADERTYPE structure) for Dolby(R) Digital Decoder Media Component is shown as below.

Table 6-3 Buffer Flag for I/O Port

Flag Name (nFlags)	Description for support
OMX_BUFFERFLAG_EOS	This flag can be used as described in the related document [2].
OMX_BUFFERFLAG_STARTTIME	These flags do not affect the processing of Media Component but the flag set to input buffer is transferred to related output buffer.
OMX_BUFFERFLAG_DECODEONLY	
OMX_BUFFERFLAG_DATACORRUPT	This flag is set to output buffer if input stream has an error. If this flag is set, silent data may be stored to output buffer.
OMX_BUFFERFLAG_ENDOFFRAME	These flags do not affect the processing of Media Component but the flag set to input buffer is transferred to related output buffer.
OMX_BUFFERFLAG_SYNCFRAME	
OMX_BUFFERFLAG_EXTRADATA	
OMX_BUFFERFLAG_CODECCONFIG	

7. Events

Table 7-1 shows events having a unique condition for Dolby(R) Digital Decoder Media Component.

Table 7-1 Events Generation Conditions

Event Type	Port	Condition
OMX_EventPortSettingsChanged	APB+0	Event is not generated.
	APB+1	Event is generated when the member nChannels, nSamplingRate, eChannelMapping in the OMX_AUDIO_PARAM_PCMMODETYPE structure are changed internally by decoding.

If OMXR_MC_AUDIO_UnitFull is set in the OMXR_MC_IndexParamAudioOutputUnit index and nChannels, nSamplingRate, eChannelMapping in the OMX_AUDIO_PARAM_PCMMODETYPE structure is changed in Dolby(R) Digital Decoder Media Component, a buffer whose size is less than the size of the buffer may be returned.

For the OMX_EventPortSettingChenged event, it is possible to suppress event generation by masking event. Table 7-2 shows maskable information for Dolby(R) Digital Decoder Media Component.

Table 7-2List of Maskable Information

Information	Masking Value
nSamplingRate	OMXR_MC_AUDIO_EVENTMASK_SAMPLINGRATE
nChannels	OMXR_MC_AUDIO_EVENTMASK_CHANNELS
eChannelMapping	OMXR_MC_AUDIO_EVENTMASK_CHANNELMAPPING

8. Memory Size

Table 8-1 shows size and purpose of main memory areas used in Dolby(R) Digital Decoder Media Component and the value of nBufferSize, nBufferCountAcutal, nBufferCountMin in the OMX_PARAM_PORTDEFINITONTYPE structure.

Table 8-1 Main Memory Areas used in Dolby(R) Digital Decoder Media Component

Memory Area Name	Memory Size (byte)			Description
Input Buffer (APB + 0)	**OMX_PARAM_PORTDEFINITIONTYPE**		**Value**	Buffer to store input stream data. This is the size of memory area allocated by the OMX_AllocateBuffer() function.
	nBufferSize	Minimum Size	3840	
		Default Size	8192	
		Maximum Size	8192	
	nBufferCountActual	Minimum Count (= nBufferCountMin)	1	
		Default Count	4	
		Maximum Count	4	
Output Buffer (APB + 1)	**OMX_PARAM_PORTDEFINITIONTYPE**		**Value**	Buffer to store output PCM data. This is the size of memory area allocated by the OMX_AllocateBuffer() function.
	nBufferSize	Minimum Size	18432	
		Default Size	32768	
		Maximum Size	32768	
	nBufferCountActual	Minimum Count (= nBufferCountMin)	1	
		Default Count	8	
		Maximum Count	8	

- Additionally, areas for such as context, task communication and internal work are need.

Revision History	OMX Media Component User's Manual Dolby(R) Digital Decoder Part

Rev.	Date	Description	
		Page	Summary
0.01	Jan. 14, 2014	-	Newly created.
0.02	Feb. 20, 2014	26	Add explanation of OMX_PARAM_PORTDEFINITIONTYPE structure in Section 8
0.03	Jun. 3, 2014	-	Correct errors.
		26	Delete the line of an internal work buffer.
0.10	Jul. 18, 2014	-	Correct errors.
1.00	Oct. 10, 2014	-	Official Release

OMX Media Component User's Manual
Dolby(R) Digital Decoder Part

Publication Date : Oct. 10, 2014 Rev. 1.00
Published by: Renesas Electronics Corporation

OMX Media Component User's Manual

Renesas Electronics Corporation