User's Manual

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OMX Media Component

User's Manual: H.263 Decoder Part

— Preliminary —

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1. Overview

1.1. About This Document

This document is the User's Manual for OMX Media Component. It describes the specifications of H.263 Decoder Media Component. For the specifications that are common to OMX video decoder, see related documents [1] and [2].

1.2. H.263 Decoder Media Component Overview and Scope

Figure 1-1 illustrates the software stacks for the H.263 Decoder Media Component and shows the scope of this document. OMX Media Component H.263 Decoder Library is a library that provides H.263 decoding functions. It requires OMX Media Component Video Decoder Common Library and OMX Media Component Common Library.

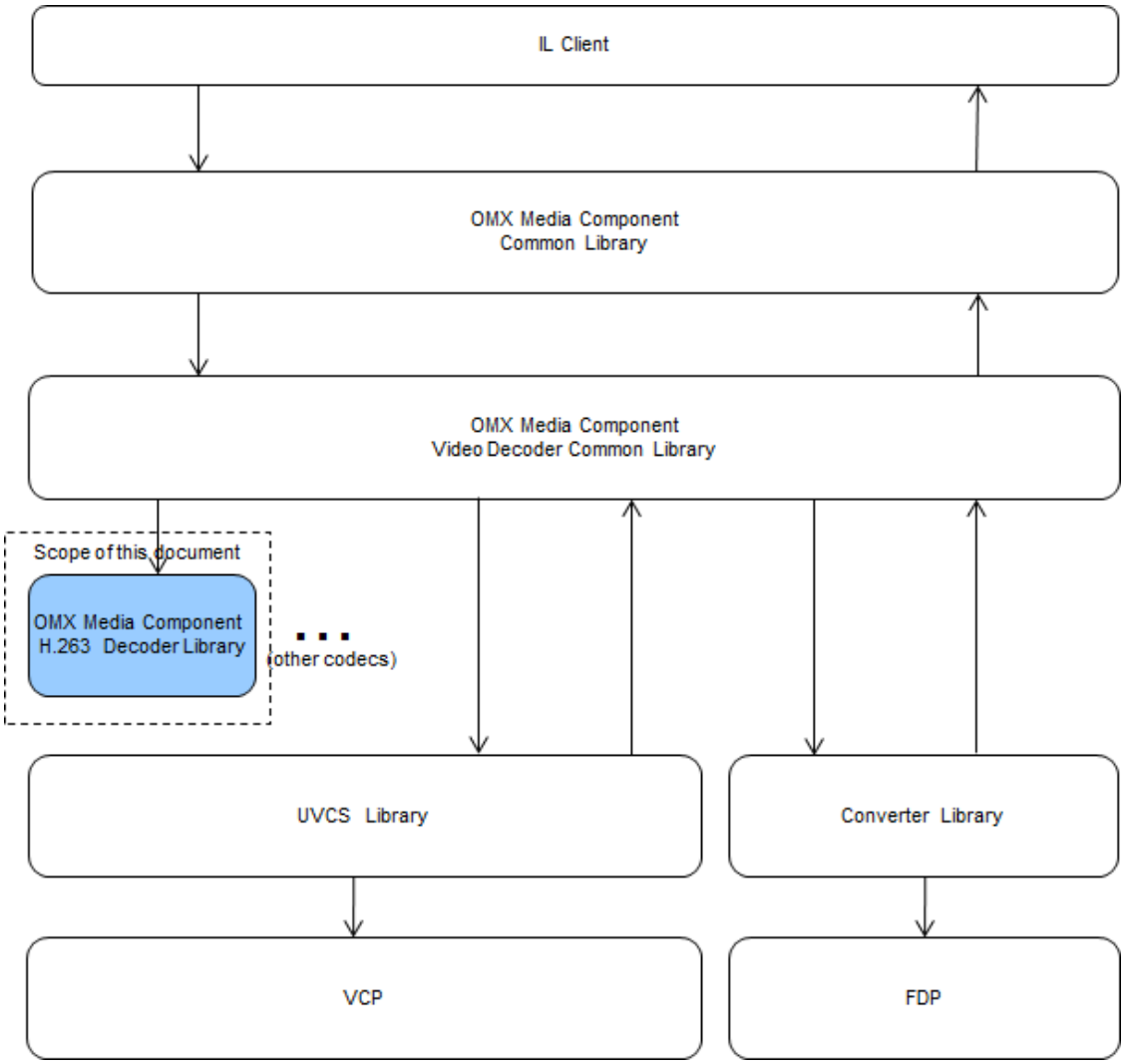

Figure 1-1 Software Stacks and Scope

This document describes the specifications of OMX Media Component H.263 Decoder library part. For the specifications of OMX Media Component Video Decoder Common Library and OMX Media Component Common Library, see related documents [1] and [2] respectively.

1.3. Required Header Files

Table 1-1 lists the header files that are required to use the OMX extended indexes and structures that are described in this document. Regarding the other header files, see related documents [1] and [2].

Table 1-1 Required Header Files

File name	Remarks
OMXR_Extension_h263.h	-
OMXR_Extension_h263d.h	-

1.4. Role Name and Component Name

Table 1-2 shows the role name and the component name for H.263 Decoder Media Component.

Table 1-2 Role Name and Component Name

Role name	Component name
video_decoder.h263	OMX.RENESAS.VIDEO.DECODER.H263

1.5. Related Documents

Table 1-3 lists the related documents.

Table 1-3 List of Related Documents

No.	Document Name	Remarks
[1]	OMX Media Component User's Manual Common Part	The common specifications for OMX Media Component
[2]	OMX Media Component User's Manual Video Decoder Common Part	The common specifications for OMX Video Decoder Media Component
[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
[4]	OMX Integration Guide for <OS >	Integration guide for OMX Media Component. Substitute <OS> with your target operating system name.

1.6. Terminology

Table 1-4 lists the terms that are used in this document.

Table 1-4 Terminology

Term	Abbreviation	Description
Video Port Base	VPB	The base value of the port index of the Video Media Component. The port index values of the input and output ports are obtained by adding offset values to this base value.
UVCS	-	Renesas proprietary video codec software module that provides multi-processing function for video decoding and encoding. OMX Video Codec products contain UVCS library.

2. Functions

H.263 Decoder Media Component is a media component which provides functions to decode video stream that is compressed according to the H263 standard. H.263 Decoder Media Component receives encoded stream data on the input port and emits the decoded video frame data on the output ports.
For the specifications that are common to OMX video decoders, see related document [2].

2.1. Function Details

2.1.1. Decode Functions

Table 2-1 shows the codec standard and functions that H.263 Decoder Media Component supports.

Table 2-1 Supported Codec Standard and Functions

Codec standard	ITU-T Rec H.263
Profile	Baseline Profile
Level	Level 70
Unsupported tools	The following tools are not supported for all profiles: - GMC (Global Motion Compensation) - QMC (Quarter-pel Motion Compensation)
Picture size	- Width : 128 - 1920 (must be multiple of 2)Note1 - Height : 96 - 1088 (must be multiple of 2)Note1
Bit rate	Maximum 40Mbits/s Note2
Frame rate	Maximum 60p Note2
Input format	H.263 Elementary Stream The following formats are supported. - Short Header (defined in MPEG-4 standard) - PLUS HEADER
Output format	YUV420 Semi-Planar format YUV420 Planar format

Note1: The allowable width and height are 1920 and the maximum number of macroblocks per picture is up to 8160 that is equals to the one of 1920x1088 stream. Therefore, 1088x1920 stream is supported.

Note2: Regarding the throughput, the following description should be noticed:
- The maximum throughput is different for each LSI. For the detail, see the LSI hardware manual.
- The throughput may fall depends on CPU load and bus traffic caused by modules except OMX Media Component.

3. I/O Data Format

3.1. Buffer Payload

3.1.1. Input Buffer Payload

- The input data unit is a frame data (see Figure 3-1)
- OMX_BUFFERFLAG_ENDOFFRAME must be set in the *nFlags* member of the OMX_BUFFERHEADERTYPE structure only when a buffer payload contains the last data of a picture data (see Figure 3-2).
- When input is the end-of-stream, OMX_BUFFERFLAG_EOS must be set in the *nFlags* member of the OMX_BUFFERHEADERTYPE structure. For the details of OMX_BUFFERFLAG_EOS, see related document [2].

ATTENTION:

- There is a performance disadvantage to store a picture data into multiple buffers. Therefore IL client should store a picture data into a single buffer.

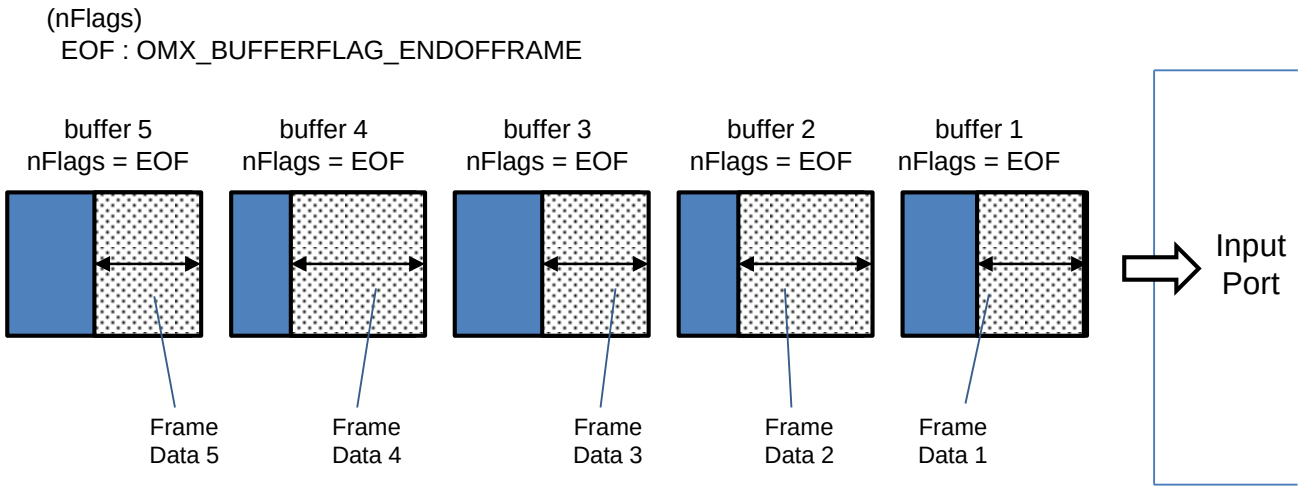

Figure 3-1 Example of Input Buffer Sequence - A Frame Data Unit

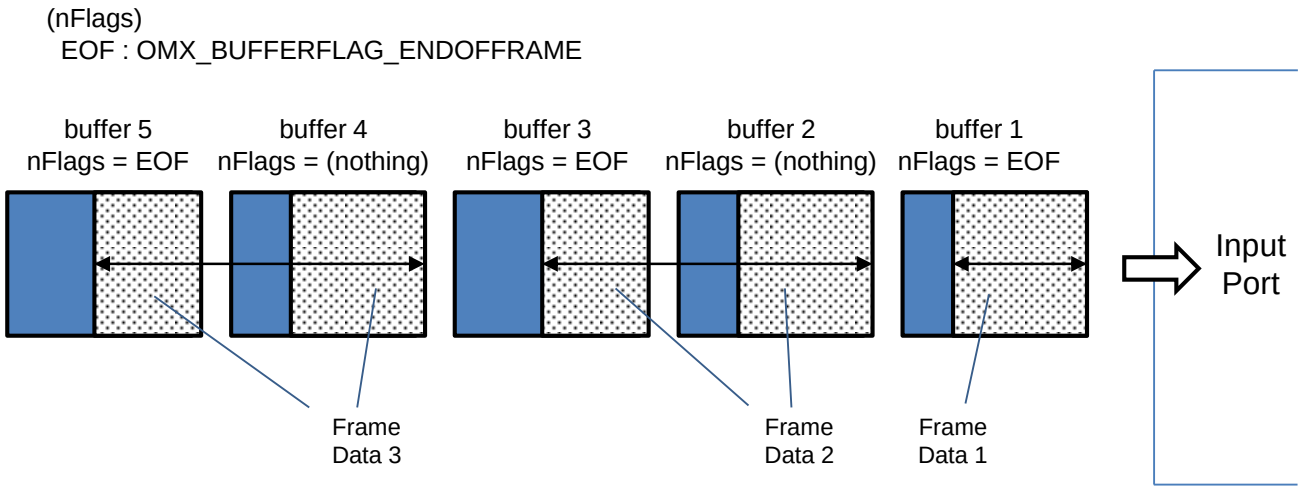

Figure 3-2 Example of Input Buffer Sequence – multiple buffers for a Frame Data

3.1.2. Output Buffer Payload

See related document [2].

3.2. Input Stream Data Format

Figure 3-3 illustrates the input stream format of the H.263 Decoder Media Component.

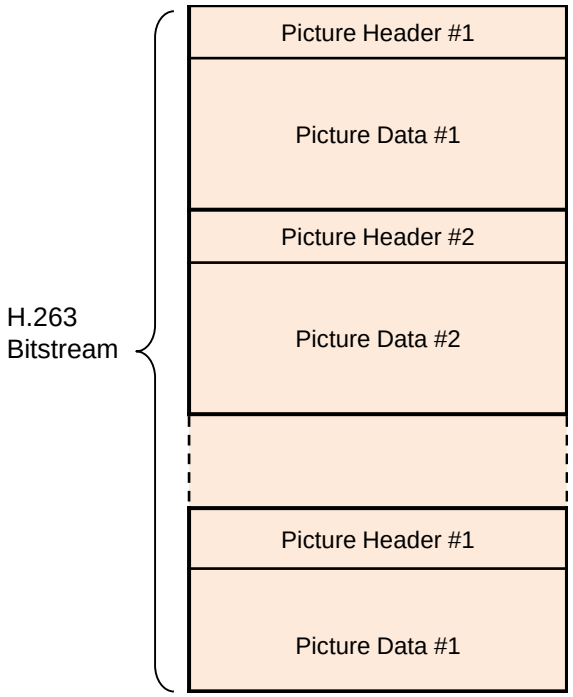

Figure 3-3 Input Stream Data Format

3.3. Output Picture Data Format

See related document [2].

4. API Reference

See related document [2].

5. Indexes

5.1. Standard Indexes of H.263 Decoder Media Component

Table 5-1 lists the OpenMAX IL standard indexes that are available for H.263 Decoder Media Component.

Table 5-1 Available Standard Indexes for H.263 Decoder Media Component

Index	Description
OMX_IndexParamPortDefinition	See related document [2]
OMX_IndexParamVideoPortFormat	
OMX_IndexConfigCommonOutputCrop	
OMX_IndexConfigCommonScale	
OMX_IndexParamVideoProfileLevelQuerySupported	
OMX_IndexParamVideoProfileLevelCurrent	
OMX_IndexParamVideoH263	See section 5.1.1

5.1.1. OMX_IndexParamVideoH263

[Description] An index to access H.263 codec related parameters.

[Corresponding Structure] OMX_VIDEO_PARAM_H263TYPE structure

[Notes] None

5.2. Extended Indexes of H.263 Decoder Media Component

Table 5-2 lists the OMX extended indexes that are available for H.263 Decoder Media Component.

Table 5-2 Available extended indexes for H.263 Decoder Media Component

Index	Description
OMXR_MC_IndexParamVideoReorder	See related document [2]
OMXR_MC_IndexParamVideoDeinterlaceMode	

5.3. Valid Indexes for OpenMAX IL Macro Functions

Table 5-3 shows which index is available for each port and which OpenMAX IL Macro function can be called to access the index.

Table 5-3 Valid Indexes and OpenMAX IL Macro Function

PortIndex	Index	Get/SetParameter		Get/SetConfig	
		Get	Set	Get	Set
VPB+0	OMX_IndexParamPortDefinition	See related document [2]			
	OMX_IndexParamVideoPortFormat				
	OMX_IndexParamVideoProfileLevelQuerySupported				
	OMX_IndexParamVideoProfileLevelCurrent				
	OMX_IndexParamVideoH263	X	X	-	-
VPB+1	OMX_IndexParamPortDefinition	See related document [2]			
	OMX_IndexParamVideoPortFormat				
	OMX_IndexConfigCommonOutputCrop				
	OMX_IndexConfigCommonScale				
	OMXR_MC_IndexParamVideoReorder				
	OMXR_MC_IndexParamVideoDeinterlaceMode				

X : Valid
- : Invalid

6. Structures

Table 6-1 lists H.263 Decoder Media Component specific structures.

Table 6-1 H.263 Decoder Media Component Specific Structures

Structure Name	Description
OMX_VIDEO_PARAM_H263TYPE	See section 6.1

Table 6-2 shows the notation for the access attribute of a structure member described in this section.

Table 6-2 Notation for the access attribute of a structure member

Member Name	Get	Set
Indicates the member name	Indicates the access attribute of the member in the OMX_GetParameter() or OMX_GetConfig(). “R” means IL client can get a value from the member. “W” means IL client must specify a value for the member.	Indicates the access attribute of the member in the OMX_SetParameter() or OMX_SetConfig(). “W” means IL client must/can specify a value for the member. “-“ means a specified value is ignored and not reflected.

6.1. OMX_VIDEO_PARAM_H263TYPE

[Description] See related document [3] section 4.3.15.

[Definition] See related document [3] section 4.3.15.

[Index] OMX_IndexParamVideoH263

[Member]

Member Name	Get	Set
nSize	W	W
nVersion	W	W
nPortIndex	W	W
nPFrames	R	-
nBFrames	R	-
eProfile	R	-
eLevel	R	-
bPLUSPTYPEAllowed	R	-
nAllowedPictureTypes	R	-
bForceRoundingTypeToZero	R	-
nPictureHeaderRepetition	R	-
nGOBHeaderInterval	R	-

[Details]

nSize

Write Value	The size of the structure in bytes.
Read Value	-
Initial Value	-
Notes	-

nVersion

Write Value	The version number of OpenMAX IL specifications 1.1.2
Read Value	-
Initial Value	-
Notes	-

nPortIndex

Write Value	VPB + 0
Read Value	-
Initial Value	-
Notes	-

nPFrames

Write Value	-
Read Value	0
Initial Value	0
Notes	-

nBFrames

Write Value	-
Read Value	0
Initial Value	0
Notes	-

eProfile

Write Value	-
Read Value	OMX_VIDEO_H263ProfileBaseline OMXR_VIDEO_H263ProfileNone
Initial Value	OMX_VIDEO_H263ProfileBaseline
Notes	The value of this member will be OMXR_VIDEO_H263ProfileNone after any Profile H.263 stream is decoded.

eLevel

Write Value	-
Read Value	OMX_VIDEO_H263Level10 OMXR_VIDEO_H263LevelNone
Initial Value	OMX_VIDEO_H263Level10
Notes	The value of this member will be OMXR_VIDEO_H263LevelNone after any Level H.263 stream is decoded.

bPLUSPTYPEAllowed

Write Value	-
Read Value	OMX_FALSE
Initial Value	OMX_FALSE
Notes	-

nAllowedPictureTypes

Write Value	-
Read Value	OMX_VIDEO_PictureTypeI OMX_VIDEO_PictureTypeP
Initial Value	(OMX_VIDEO_PictureTypeI | OMX_VIDEO_PictureTypeP)
Notes	-

bForceRoundingTypeToZero

Write Value	-
Read Value	OMX_TRUE
Initial Value	OMX_TRUE
Notes	-

nPictureHeaderRepetition

Write Value	-
Read Value	0
Initial Value	0
Notes	-

nGOBHeaderInterval

Write Value	-
Read Value	0
Initial Value	0
Notes	-

6.2. Specific Usage on Common Structure Members

This section describes H.263 Decoder Media Component specific usage of the structures that are described in related document [2].

6.2.1. OMX_VIDEO_PORTDEFINITIONTYPE (Input Port)

[Index] OMX_IndexParamPortDefinition

[Details]

nFrameWidth

Write Value	128 - 1920
Read Value	(Current setting)
Initial Value	176
Notes	− An odd value is rounded down to the closest even value. − No effects on the decode processing.

nFrameHeight

Write Value	96 - 1920
Read Value	(Current setting)
Initial Value	144
Notes	− An odd value is rounded down to the closest even value. − No effects on the decode processing.

eCompressionFormat

Write Value	-
Read Value	OMX_VIDEO_CodingH263
Initial Value	OMX_VIDEO_CodingH263
Notes	-

6.2.2. OMX_VIDEO_PARAM_PORTFORMATTYPE (Input Port)

[Index] OMX_IndexParamVideoPortFormat

[Details]

eCompressionFormat

Write Value	-
Read Value	OMX_VIDEO_CodingH263
Initial Value	OMX_VIDEO_CodingH263
Notes	-

6.2.3. OMX_VIDEO_PARAM_PROFILELEVELTYPE (ProfileLevelQuerySupport)

[Index] OMX_IndexParamVideoProfileLevelQuerySupported

[Details]

eProfile

Write Value	-
Read Value	OMX_VIDEO_H263ProfileBaseline (*nProfileIndex*=0)
Initial Value	OMX_VIDEO_H263ProfileBaseline
Notes	-

eLevel

Write Value	-
Read Value	OMX_VIDEO_H263Level70 (nProfileIndex=0)
Initial Value	OMX_VIDEO_H263Level70
Notes	-

nProfileIndex

Write Value	0
Read Value	-
Initial Value	-
Notes	-

6.2.4. OMX_VIDEO_PARAM_PROFILELEVELTYPE (ProfileLevelCurrent)

[Index] OMX_IndexParamVideoProfileLevelCurrent

[Details]

eProfile

Write Value	-
Read Value	OMX_VIDEO_H263ProfileBaseline OMXR_VIDEO_H263ProfileNone
Initial Value	OMX_VIDEO_H263ProfileBaseline
Notes	The value of this member will be OMXR_VIDEO_H263ProfileNone after any Profile H.263 stream is decoded.

eLevel

Write Value	-
Read Value	OMX_VIDEO_H263Level10 OMXR_MC_VIDEO_H263LevelNone
Initial Value	OMX_VIDEO_H263Level10
Notes	The value of this member will be OMXR_VIDEO_H263LevelNone after any Level H.263 stream is decoded.

nProfileIndex

Write Value	-
Read Value	0
Initial Value	0
Notes	-

6.2.5. OMXR_MC_VIDEO_DECODERESULTTYPE

[Index] N/A

[Details]

u32PictWidth

Write Value	-
Read Value	The width of the decoded picture data in pixels
Initial Value	-
Notes	None.

u32PictHeight

Write Value	-
Read Value	The height of the decoded picture data in pixels
Initial Value	-
Notes	None.

6.2.6. Buffer Flags (*nFlags*)

H.263 Decoder Media Component has specific usage for the buffer flags listed in Table 6-3. For the other flags, see related document [2].

Table 6-3 Specific Usage on Buffer Flags

flag	Description
OMX_BUFFERFLAG_CODECCONFIG	This flag is not used in H.263 Decoder Media Component.

7. Memory Requirement

Table 7-1 describes the types of the memory that H.263 Decoder Media Component requires.

Table 7-1 Required Memory Types

Memory Type	Accessible from	Description
input buffer	Hardware and CPU	Buffers for the input port. The required memory size is 1,572,864 x *nBufferCountActual*. For details of the *nBufferCountActual* member, see related document [2].
output buffer	Hardware and CPU	Buffers for the output port. The required memory size is (*nStride* x *nSliceHeight* x 3 / 2) x *nBufferCountActual.* For details of the *nBufferCountActual* member, see related document [2]. In the case IL client uses OMX_UseBuffer() for the output port, the allocated buffers must be accessible from hardware and need not be accessible from CPU.
work buffer	Hardware and CPU	Work buffers for decoding.
stream_work_0	Hardware	Work buffers for decoding.
stream_work_1	Hardware and CPU	
stream_work_2	Hardware	Work buffers for decoding. stream_work_2 is mv information work area.
stream_work_4	Hardware and CPU	Work buffers for decoding.
stream_work_5	Hardware and CPU	
frame_mem	Hardware	Frame buffers used for reference decoding and output.

Note: For hardware restrictions of memory, see related document [4].

Table 7-2 shows the memory requirement in the case of 1920x1080 stream decoding per component instance. Multiple component instances require their own work memory, respectively..

Table 7-2 Memory Requirement for 1920x1080 Stream Decoding

Memory Type	Size	Notes
input buffer	3 [Mbyte]	In the case where the *nBufferCountActual* for the input port is set to 2.
output buffer	9 [Mbyte]	In the case where the *nBufferCountActual* for the output port is set to 3.
work buffer	3 [Mbyte]	-
stream_work_0	20 [Mbyte]	-
stream_work_1	139 [Kbyte]	Fixed size
stream_work_2	2 [Kbyte]	-
stream_work_4	2 [Kbyte]	-
stream_work_5	1 [Kbyte]	Fixed size
frame_mem	17 [Mbyte]	-

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Rev.	Date	Description	
		Page	Summary
0.05	Dec. 2, 2013	―	Draft revision based on Japanese User's Manual Rev.0.05.
0.06	Mar. 25, 2014	28	Add the detailed information of Memory Requirement.
0.07	May. 29, 2014	4,9,10	Fixed Figure1-1: "Video Common Library" to "Video Decoder Common Library" Fixed Figure 3-1,3-3 and 3-4: "Data Frame" to "Frame Data"
	May. 30, 2014	28	Correct the descriptions for stream_work_x and lib_work_mem in Table 7-1
	June. 4, 2014	28	Correct the value for stream_work_x size in Table 7-2
	Jul. 4,2014	28	Updated Description of stream_work_* in Table7-1 Updated Notes and Size in Table7-2
0.0.8	Jul. 29, 2014	28	Fixed Table 7-1: Highlight reference to the related document.
1.0.0	Aug. 20 2014	27	Add section 6.3.5.OMXR_MC_VIDEO_DECODERESULTTYPE.
	Aug. 20 2014	28	Fixed Table 7-1
	Aug. 28 2014	―	Modify and Delete MPEG-4 description
1.0.1	Oct.14 2014	27-28	Added the "work buffer" in Table7-1/Table7-2.
	Dec. 15 2014	30-31	Remove "lib_work_mem", "stream_work_3" and "tmp_work_mem" from Table7-1 and Table7-2.

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