

ISO/IEC 23002-4:2018-03 (E)

Information technology - MPEG video technologies - Part 4: Video tool library

Contents		Page
Foreword		viii
Introduction		x
1	Scope	1
2	Normative references	1
3	Terms and definitions	2
4	FU description convention	2
4.1	FU interface	2
4.2	FU IDs	3
4.3	Token pool	7
4.4	Array data order	10
4.5	Input ports (reset_i, init_i, start_i)	10
4.6	FU block diagram notations	10
4.7	Conventions	11
4.8	Granular FU	11
5	General-purpose FUs	11
5.1	Syntax parsing	11
5.1.1	Generic syntax parser	11
5.1.2	Algo_Byte2bit	11
5.1.3	Mgnt_Select_MB_4	12
5.1.4	Mgnt_Merger420	12
5.1.5	Mgnt_Select_MB_8	12
5.1.6	Mgnt_SynP_DEMUX	13
5.1.7	Mgnt_SynP_BytePreprocessor	13
5.2	General processing FUs	14
5.2.1	Algo_InverseQuantization1D	14
5.2.2	Algo_InverseQuantizationND	15
5.2.3	Algo_InversePrediction1D	18
5.2.4	Algo_InversePredictionND	20
5.2.5	Algo_ED_AD_StaticBit	24
5.2.6	Algo_ED_VLD	26
5.2.7	Algo_ED_AD_AdaptiveBit	27
5.2.8	Algo_ED_BitPrecision	28
5.2.9	Algo_ED_AD	31
5.2.10	Algo_ED_AD_EG	36
5.2.11	Algo_ED_4bitsD	42
5.2.12	Algo_ED_FixedLength	44
5.2.13	Algo_LookUpTable1D	45
5.2.14	Algo_ContextModeling	46
5.2.15	Algo_simpleMath_2op	48
5.2.16	Mgnt_Replicate_1_2	50
5.2.17	Mgnt_Replicate_1_4	50
5.2.18	Mgnt_Replicate_1_8	51
5.2.19	Mgnt_MUX_2_1	52
5.2.20	Mgnt_MUX_4_1	53
5.2.21	Mgnt_MUX_8_1	55
5.2.22	Mgnt_DEMUX_1_2	56

5.2.23	Mgnt_DEMUX_1_4	57
5.2.24	Mgnt_DEMUX_1_8	59
5.2.25	Mgnt_ExtractSegment	60
5.2.26	Mgnt_ProviderValue	61
5.2.27	Mgnt_RepeatSegment	62
5.2.28	Mgnt_ExtractBytes	64
5.2.29	Mgnt_ExtractBits	65
5.2.30	Mgnt_Provider1D	66
5.2.31	Mgnt_Provider2D	67
6	FUs for MPEG-4 Simple Profile	69
6.1	General	69
6.2	Syntax parsing	69
6.2.1	Algo_SynP	69
6.2.2	Mgnt_BlockExpand	69
6.2.3	Mgnt_Splitter420B	70
6.2.4	Mgnt_Splitter420MV	70
6.2.5	Algo_MVR_MedianOfThreeLeftAndTopAndTopRight	71
6.2.6	Mgnt_Splitter_420_TYPE	71
6.2.7	Algo_VLDtableB6_MPEG4Part2	72
6.2.8	Algo_VLDtableB7_MPEG4Part2	72
6.2.9	Algo_VLDtableB8_MPEG4Part2	73
6.2.10	Algo_VLDtableB12_MPEG4Part2	73
6.2.11	Algo_VLDtableB13_MPEG4Part2	73
6.2.12	Algo_VLDtableB14_MPEG4Part2	74
6.2.13	Algo_VLDtableB15_MPEG4Part2	74
6.2.14	Algo_VLDtableB16_MPEG4Part2	75
6.2.15	Algo_VLDtableB17_MPEG4Part2	75
6.3	Texture decoding	76
6.3.1	Algo_IQ_QSAndQmatrixMp4vOrH263Scaler	76
6.3.2	Algo_DCRAddr_ThreeLeftTop_8x8	76
6.3.3	Algo_DCRAddr_ThreeLeftTop_16x16	77
6.3.4	Algo_DCRInvPred_CHROMA_8x8	77
6.3.5	Algo_DCRInvPred_LUMA_16x16	78
6.3.6	Algo_IS_ZigzagOrAlternateHorizontalVertical_8x8	79
6.3.7	Algo_IAP_AdaptiveHorizontalOrVerticalPred_8x8	79
6.3.8	Algo_IAP_AdaptiveHorizontalOrVerticalPred_16x16	80
6.3.9	Algo_IDCT2D_ISOIEC_23002_1	80
6.3.10	Mgnt_DCSplit	81
6.4	Motion compensation	81
6.4.1	Mgnt_FB_w_Address_8x8	81
6.4.2	Mgnt_FB_w_Address_16x16	82
6.4.3	Algo_PictureReconstruction_Saturation	82
6.4.4	Algo_Interp_HalfpelBilinearRoundingControl	83
7	FUs for MPEG-4 AVC Constrained Baseline Profile	84
7.1	General	84
7.2	Syntax parsing	84
7.2.1	Algo_NALU	84
7.2.2	Algo_SynP	84
7.2.3	Algo_BlockExpand	85
7.2.4	Algo_BlockSplit	85
7.2.5	Algo_IntraPred_Split	86
7.2.6	Algo_Parser_I_PCM	86
7.2.7	Algo_DemuxParserInfoForBlocks_Chroma	87
7.2.8	Algo_DemuxParserInfoForBlocks_Luma	87
7.3	Texture decoding	88
7.3.1	Algo_IS_Zigzag_4x4	88
7.3.2	Algo_DCR_Hadamard_LUMA_IHT1d	88
7.3.3	Algo_Transpose4x4	89
7.3.4	Algo_DCR_Hadamard_LUMA_Reordering	89
7.3.5	Algo_DCR_Hadamard_LUMA_Scaling	90

7.3.6	Algo_DCR_Hadamard_CHROMA	90
7.3.7	Algo_IT4x4_1d	90
7.3.8	Algo_IT4x4_Addshift	91
7.3.9	Algo_IntraPred_LUMA_16x16	91
7.3.10	Algo_IntraPred_LUMA_4x4	92
7.3.11	Algo_Merge_4x4_to_16x16	92
7.3.12	Algo_IQ_QSAndSLAndIDCTScaler_4x4	92
7.3.13	Mgnt_IQ_INTRA16x16	93
7.3.14	Algo_IntraPred_4x4_to_8x8	93
7.3.15	Algo_IntraPred_CHROMA	94
7.3.16	Mgnt_Intra16x16	94
7.3.17	Mgnt_Intra4x4	95
7.3.18	Mgnt_IQ_Chroma	95
7.3.19	Mgnt_Buffer_Neighbour_FullMb	95
7.3.20	Mgnt_Buffer_Neighbour_YxY	96
7.3.21	Algo_Merge_4x4_to_16x16_norasterscan	96
7.3.22	Algo_Split_16x16_to_4x4_norasterscan	97
7.4	Motion compensation	97
7.4.1	Algo_Interp_EighthPelBilinear	97
7.4.2	Algo_Interp_SeparableSixTapQuarterPel	98
7.4.3	Algo_Interp_Reord	98
7.4.4	Algo_MvLXReconstr	99
7.4.5	Mgnt_DPB	99
7.4.6	Algo_MMCO	100
7.4.7	AlgoRefList	100
7.4.8	Mgnt_InterPred	101
7.4.9	Algo_RefldxtoFrameNum	101
7.5	Filtering	102
7.5.1	Mgnt_DBF_AdaptiveFilter	102
7.5.2	Algo_DBF_AdaptiveFilter	102
7.5.3	Algo_MvComponentReorder	103
7.6	Renderer	103
7.6.1	Mgnt_POC	103
7.6.2	Mgnt_BufferRender	103
7.6.3	Mgnt_Merger420_AVC	104
8	FUs for MPEG-4 AVC Progressive High Profile	104
8.1	General	104
8.1.1	Overview	104
8.1.2	Algo_SynP	104
8.1.3	Algo_BlockExpand	106
8.1.4	Algo_DemuxParserInfoForBlocks_Luma	106
8.2	Texture decoding	107
8.2.1	Algo_IS_Zigzag_8x8	107
8.2.2	Algo_IQ_QSAndSLAndIDCTScaler_8x8	107
8.2.3	Algo_IIT_8x8	107
8.2.4	Algo_IntraPred_LUMA_8x8	108
8.2.5	Mgnt_Intra_8x8	108
8.2.6	Algo_Merge_8x8_to_16x16	109
8.2.7	Algo_DCR_Hadamard_CHROMA	109
8.2.8	Algo_DCR_Hadamard_LUMA_Scaling	110
8.2.9	Algo_IQ_QSAndSLAndIDCTScaler_4x4	110
8.2.10	Algo_Merge_8x8_to_16x16_norasterscan	111
8.2.11	Algo_Split_16x16_to_8x8_norasterscan	111
8.2.12	Mgnt_I4x4_I8x8_demux	111
8.2.13	Mgnt_I4x4_I8x8_mux	112
8.3	Motion compensation	112
8.3.1	Algo_GeneratePredWeight	112
8.3.2	Mgnt_SelectMvpLX	113
8.3.3	Algo_MvLXReconstr	113
8.3.4	Algo_MvBuffer	114
8.3.5	Mgnt_SelectMvpLX	115

8.3.6	Algo_FrameNumToPocList	115
8.4	Filtering	115
8.4.1	Algo_DBF_AdaptiveFilter	115
8.4.2	Algo_MvComponentReorder	116
9	MPEG-4 Part 16 SC3DMC decoder specific FUs	117
9.1	General	117
9.2	Algo_ExtractMask_SC3DMC	117
9.3	MPEG-4 SC3DMC TFAN Specific FUs	118
9.3.1	Algo_DecodeConnectivity_TFAN	118
9.4	MPEG-4 SC3DMC SVA Specific FUs	123
9.4.1	Algo_ContextModeling_SVA_nType	123
9.4.2	Algo_ContextModeling_SVA_Indexes	125
9.4.3	Algo_ContextModeling_SVA_Vertex_Attribute	127
9.4.4	Algo_DecodeConnectivity_SVA	130
9.4.5	Algo_ExtractFaceDirection_SVA	134
9.4.6	Algo_Connectivity_InversePrediction_SVA	135
10	FUs for HEVC Main Profile	137
10.1	General	137
10.2	Syntax parsing	137
10.2.1	Algo_SynP	137
10.3	Texture decoding	138
10.3.1	Algo_IntraPrediction	138
10.3.2	selectCU	138
10.4	Motion compensation	139
10.4.1	Algo_InterPrediction	139
10.4.2	Mgnt_DecodedPictureBuffer	139
10.4.3	Algo_GenerateRefList	140
10.4.4	Algo_MvComponentPred	140
10.5	Filtering	141
10.5.1	Algo_SaoFilter	141
10.5.2	Algo_GenerateBs	141
10.5.3	Algo_DeblockingFilter	142
10.5.4	Algo_QpGen	142
10.6	MD5 check	142
10.6.1	Mgnt_MD5SplitInfo	142
10.6.2	Mgnt_padding	143
10.6.3	Mgnt_MD5Shifter	143
10.6.4	Mgnt_MD5Compute	143
10.7	Inverse transforms	144
10.7.1	Mgnt_IT_Splitter	144
10.7.2	Mgnt_IT_Merger	144
10.7.3	Mgnt_Block_Merger	145
10.7.4	Mgnt_Transpose_4x4	145
10.7.5	Mgnt_Transpose_8x8	145
10.7.6	Mgnt_Transpose_16x16	146
10.7.7	Mgnt_Transpose_32x32	146
10.7.8	Mgnt_Transpose_32x32	146
10.7.9	Algo_IT4x4_1d	146
10.7.10	Algo_IT8x8_1d	147
10.7.11	Algo_IT16x16_1d	147
10.7.12	Algo_IT32x32_1d	147
10.7.13	Algo_invDST4x4_1st	148
10.7.14	Algo_invDST4x4_2nd	148
Annex A (normative)	Naming convention of FU	149
Annex B (informative)	FU network examples	151
Annex C (informative)	FNL of MPEG-4 AVC Progressive High Profile decoder	186

Annex D (normative) Granular FUs concept	218
Annex E (informative) Granular FUs	219
Annex F (normative) Parallelogram prediction	236
Annex G (informative) Network specifications	240
Annex H (informative) Patent statement	241
Annex I (informative) Instantiation of generic syntax parser FU from BSD	242
Bibliography	261