FIG. 1

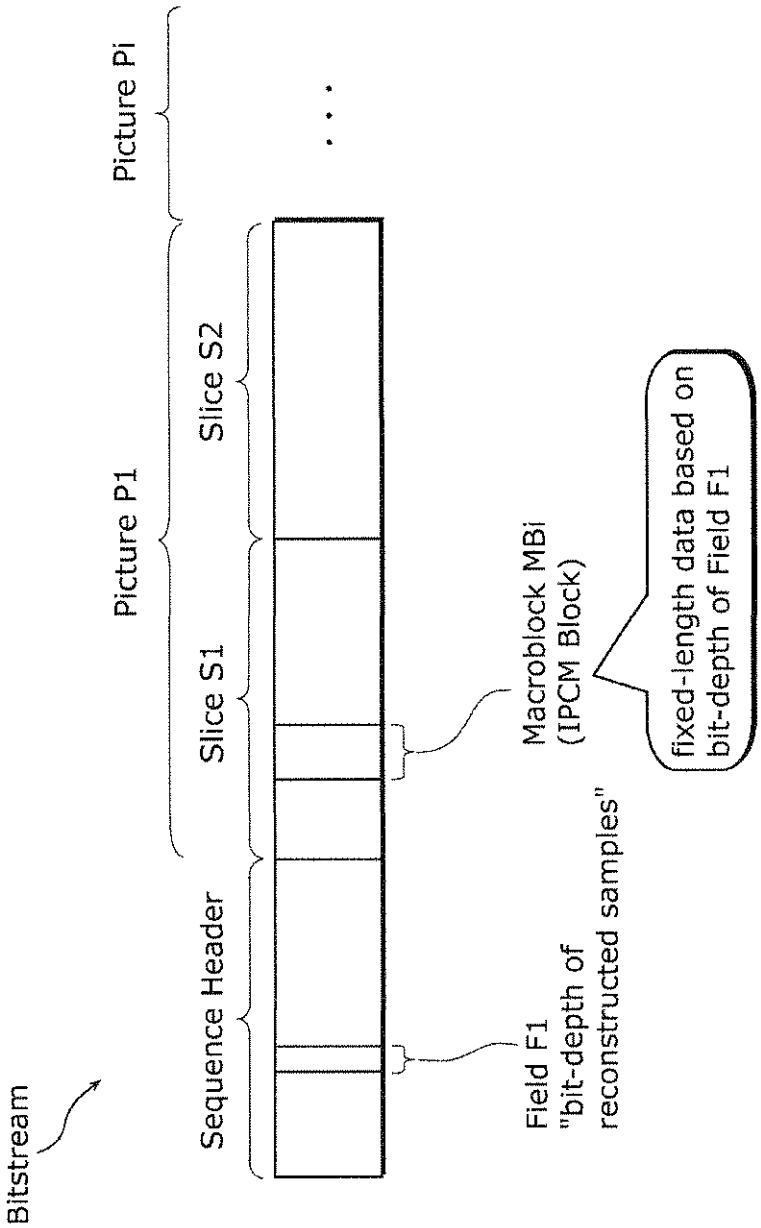

Bitstream
Sequence Header
Picture P1
Slice S1
Slice S2
Picture Pi
. . .
Field F1
"bit-depth of
reconstructed samples"
Macroblock MBi
(IPCM Block)
fixed-length data based on
bit-depth of Field F1

FIG. 2

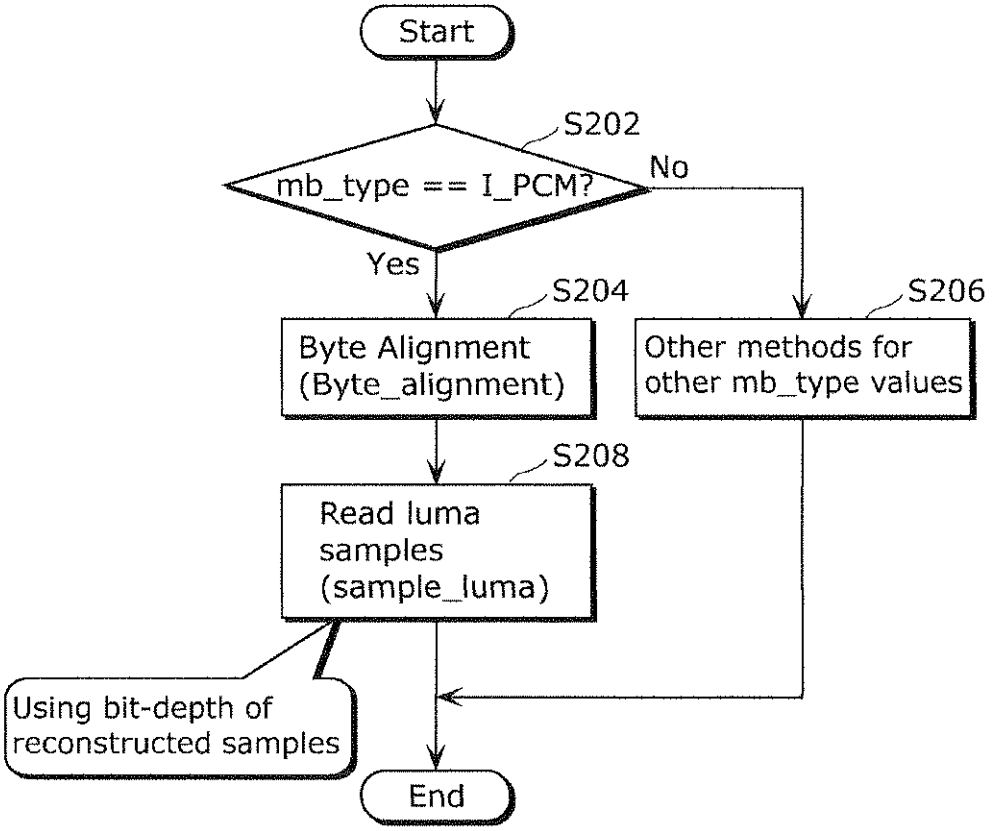

Start
S202
mb_type == I_PCM?
No
Yes
S204
Byte Alignment
(Byte_alignment)
S206
Other methods for
other mb_type values
S208
Read luma
samples
(sample_luma)
Using bit-depth of
reconstructed samples
End

FIG. 3

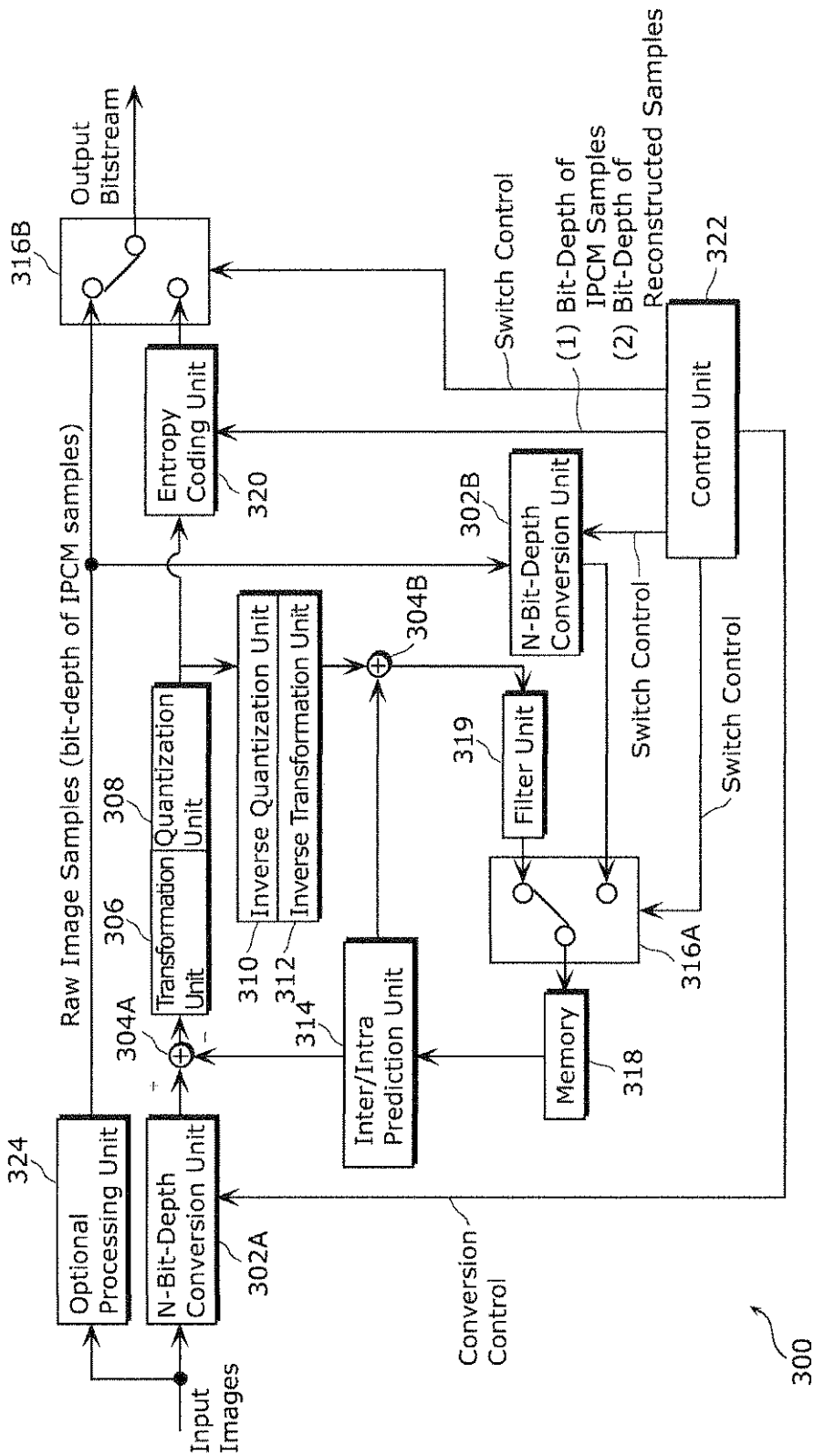

Input Images
Optional Processing Unit
324
N-Bit-Depth Conversion Unit
302A
Conversion Control
Raw Image Samples (bit-depth of IPCM samples)
304A
Transformation Unit
306
Quantization Unit
308
Inverse Quantization Unit
310
Inverse Transformation Unit
312
304B
314
Inter/Intra Prediction Unit
Memory
318
316A
Filter Unit
319
N-Bit-Depth Conversion Unit
302B
Entropy Coding Unit
320
316B
Output Bitstream
Switch Control
(1) Bit-Depth of IPCM Samples
(2) Bit-Depth of Reconstructed Samples
Control Unit
322
300

FIG. 4

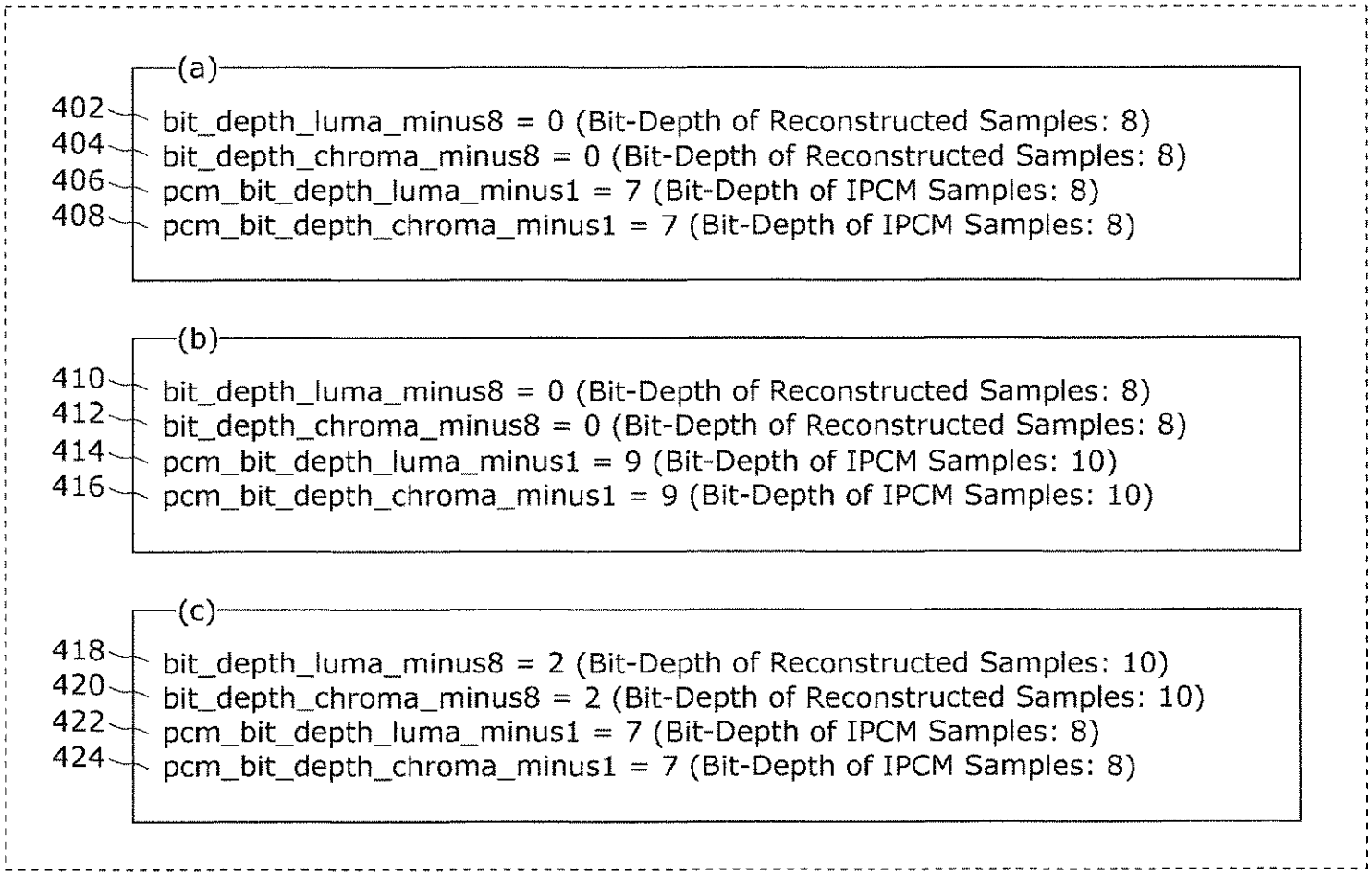

(a)
402
bit_depth_luma_minus8 = 0 (Bit-Depth of Reconstructed Samples: 8)
404
bit_depth_chroma_minus8 = 0 (Bit-Depth of Reconstructed Samples: 8)
406
pcm_bit_depth_luma_minus1 = 7 (Bit-Depth of IPCM Samples: 8)
408
pcm_bit_depth_chroma_minus1 = 7 (Bit-Depth of IPCM Samples: 8)
(b)
410
bit_depth_luma_minus8 = 0 (Bit-Depth of Reconstructed Samples: 8)
412
bit_depth_chroma_minus8 = 0 (Bit-Depth of Reconstructed Samples: 8)
414
pcm_bit_depth_luma_minus1 = 9 (Bit-Depth of IPCM Samples: 10)
416
pcm_bit_depth_chroma_minus1 = 9 (Bit-Depth of IPCM Samples: 10)
(c)
418
bit_depth_luma_minus8 = 2 (Bit-Depth of Reconstructed Samples: 10)
420
bit_depth_chroma_minus8 = 2 (Bit-Depth of Reconstructed Samples: 10)
422
pcm_bit_depth_luma_minus1 = 7 (Bit-Depth of IPCM Samples: 8)
424
pcm_bit_depth_chroma_minus1 = 7 (Bit-Depth of IPCM Samples: 8)

FIG. 5

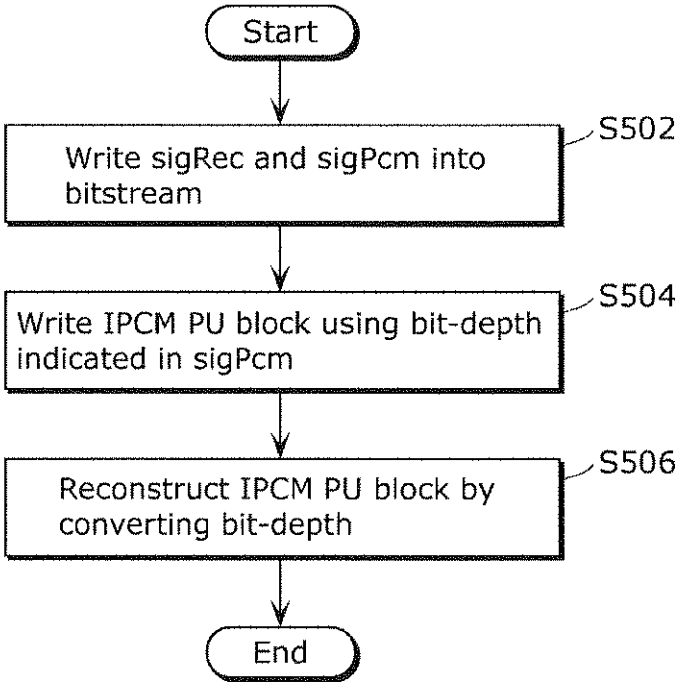

Start
Write sigRec and sigPcm into bitstream
S502
Write IPCM PU block using bit-depth indicated in sigPcm
S504
Reconstruct IPCM PU block by converting bit-depth
S506
End

FIG. 6

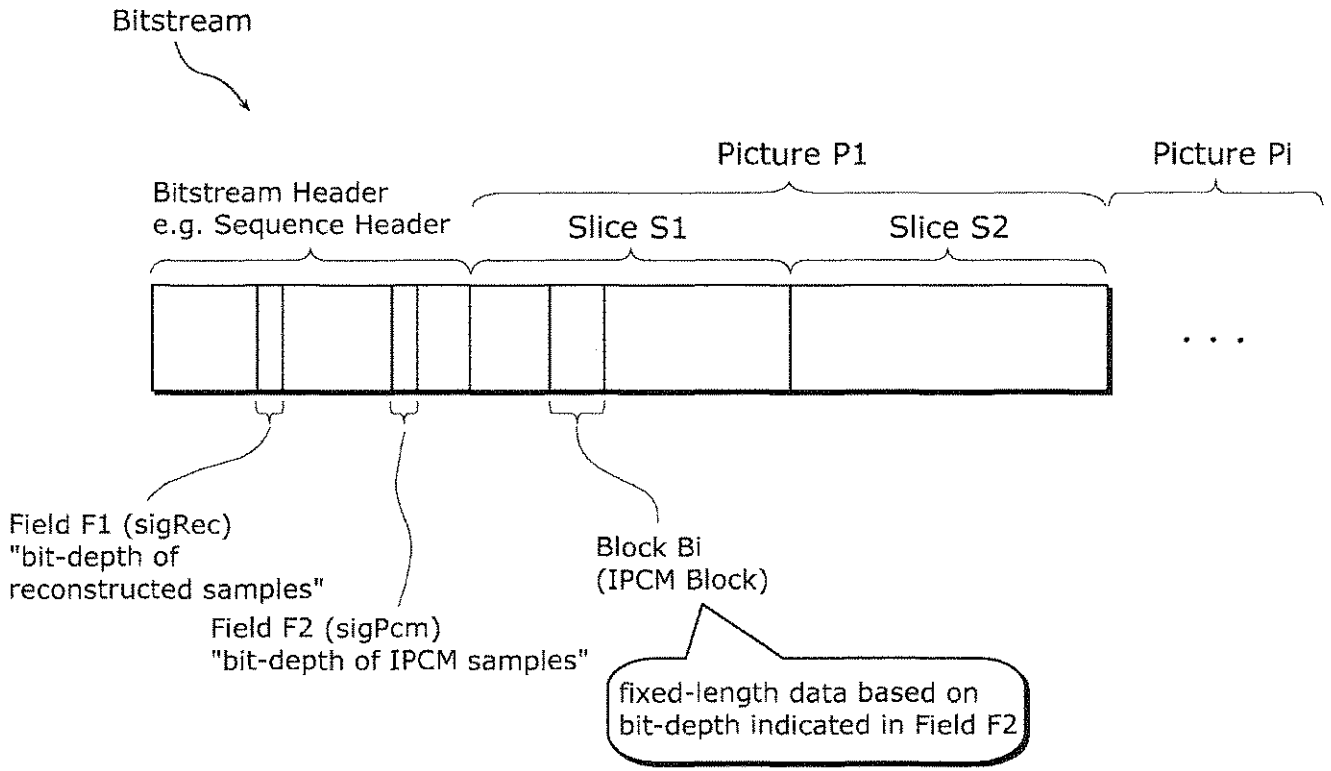

Bitstream
Picture P1
Picture Pi
Bitstream Header
e.g. Sequence Header
Slice S1
Slice S2
Field F1 (sigRec)
"bit-depth of
reconstructed samples"
Field F2 (sigPcm)
"bit-depth of IPCM samples"
Block Bi
(IPCM Block)
fixed-length data based on
bit-depth indicated in Field F2

FIG. 7

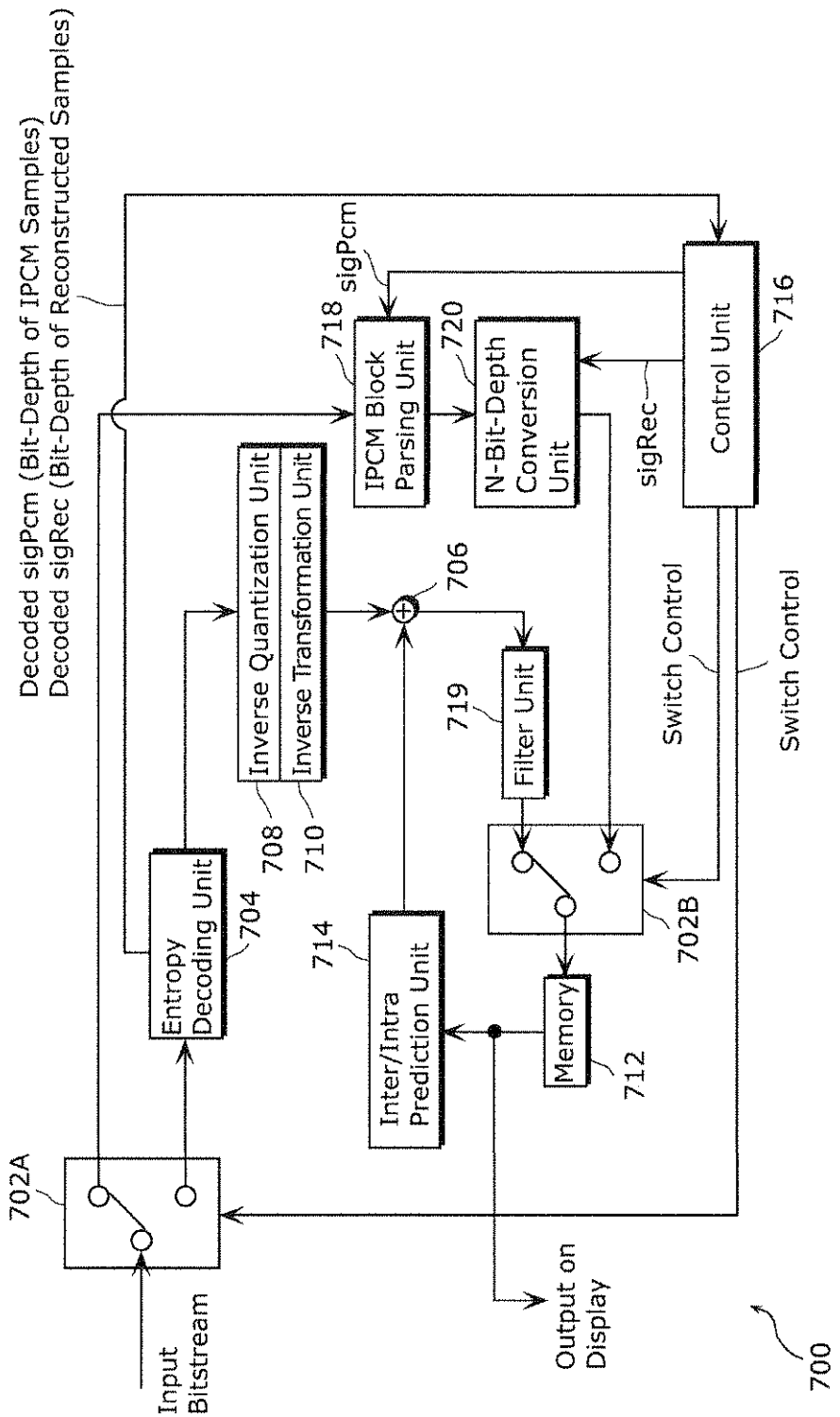

Decoded sigPcm (Bit-Depth of IPCM Samples)
Decoded sigRec (Bit-Depth of Reconstructed Samples)
sigPcm
718
IPCM Block Parsing Unit
720
N-Bit-Depth Conversion Unit
sigRec
Control Unit
716
Inverse Quantization Unit
Inverse Transformation Unit
708
710
706
719
Filter Unit
Switch Control
Switch Control
Entropy Decoding Unit
704
714
Inter/Intra Prediction Unit
Memory
712
702B
702A
Input Bitstream
Output on Display
700

FIG. 8

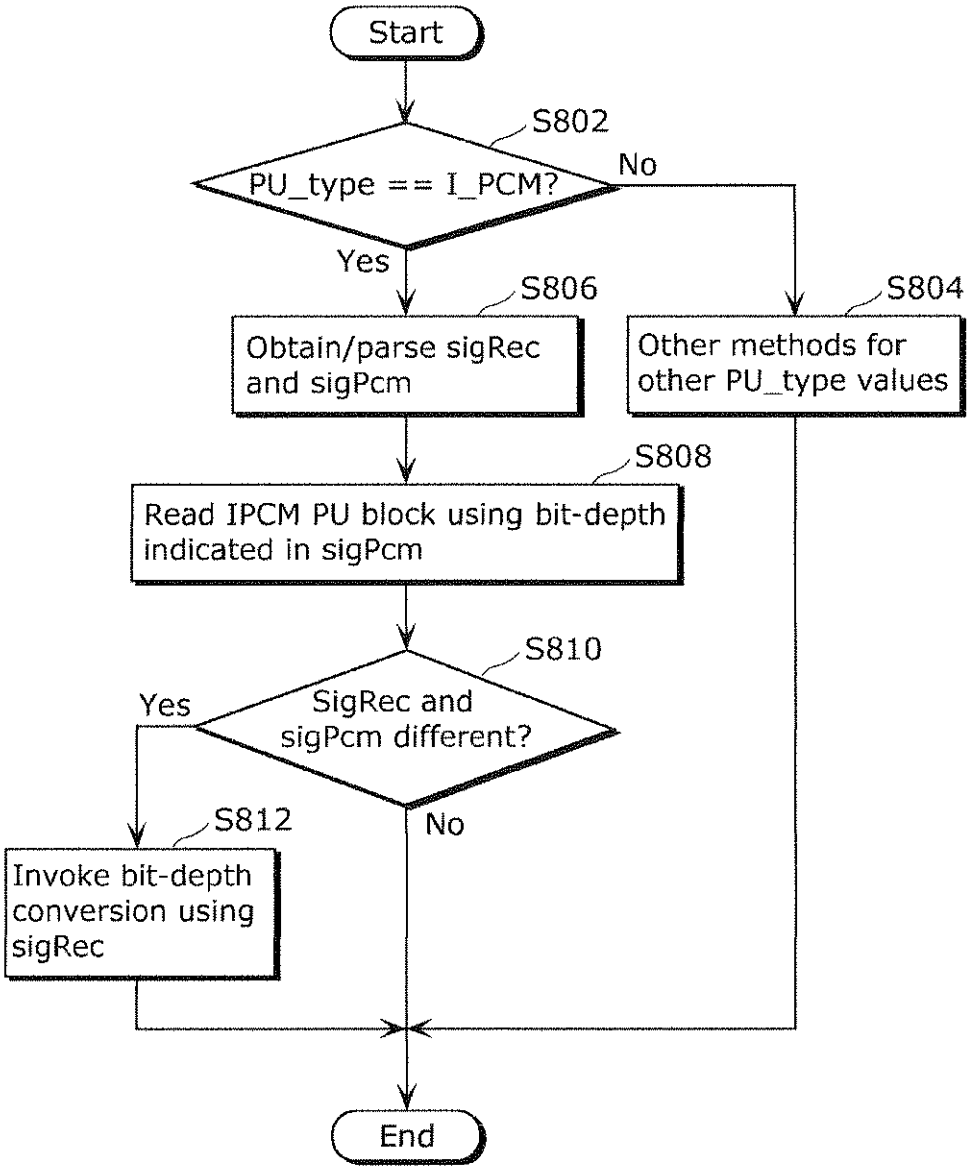

Start
S802
PU_type == I_PCM?
No
Yes
S806
Obtain/parse sigRec and sigPcm
S804
Other methods for other PU_type values
S808
Read IPCM PU block using bit-depth indicated in sigPcm
S810
Yes
SigRec and sigPcm different?
No
S812
Invoke bit-depth conversion using sigRec
End

FIG. 9

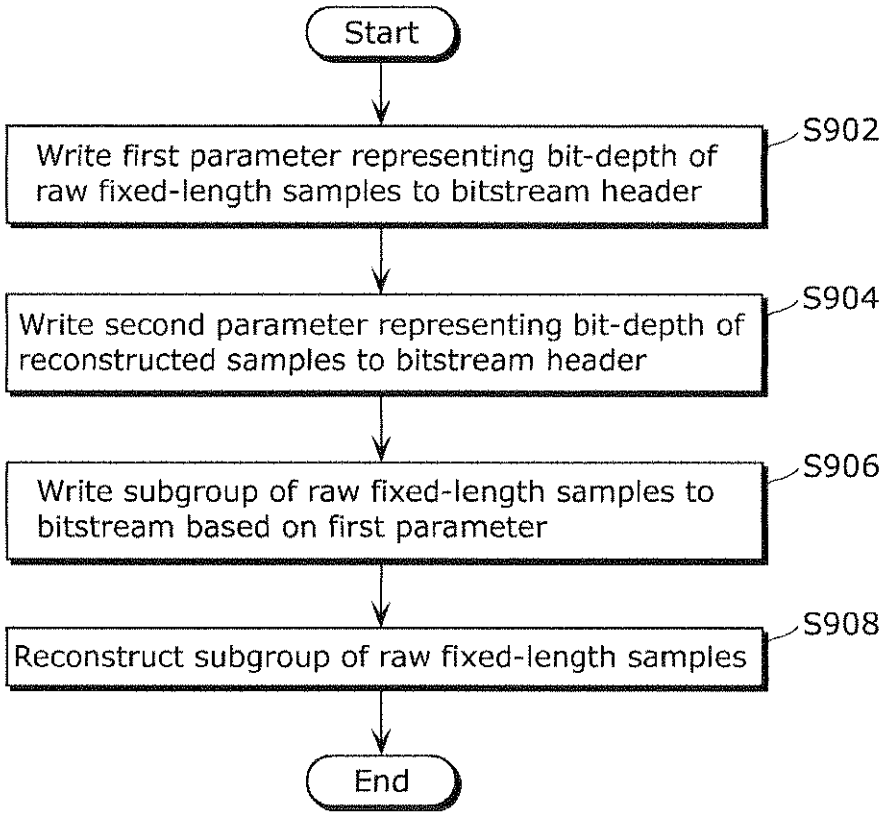

Start
Write first parameter representing bit-depth of raw fixed-length samples to bitstream header
S902
Write second parameter representing bit-depth of reconstructed samples to bitstream header
S904
Write subgroup of raw fixed-length samples to bitstream based on first parameter
S906
Reconstruct subgroup of raw fixed-length samples
S908
End

FIG. 10A

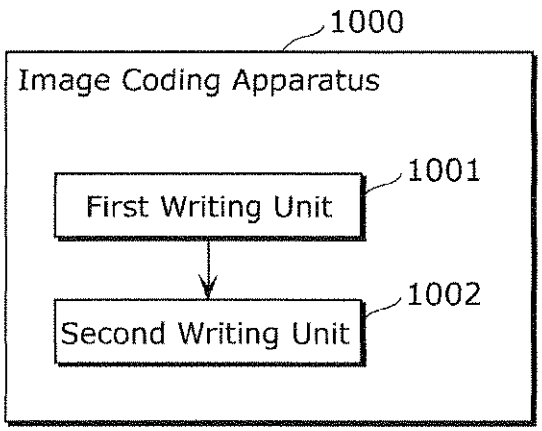

1000
Image Coding Apparatus
First Writing Unit
1001
Second Writing Unit
1002

FIG. 10B

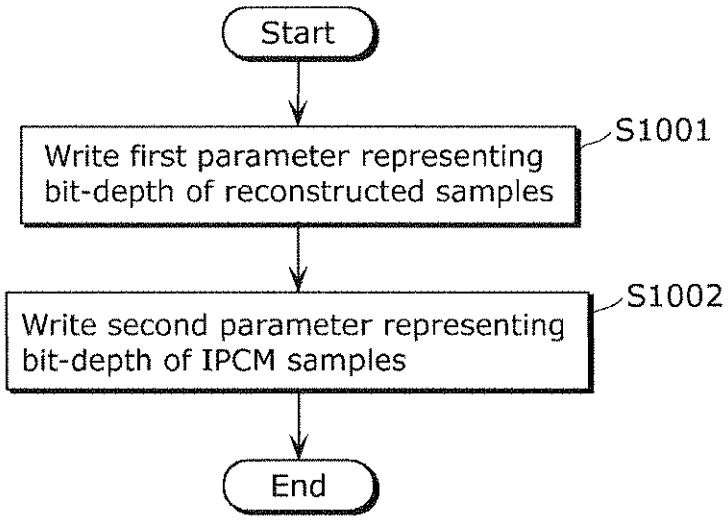


FIG. 11A

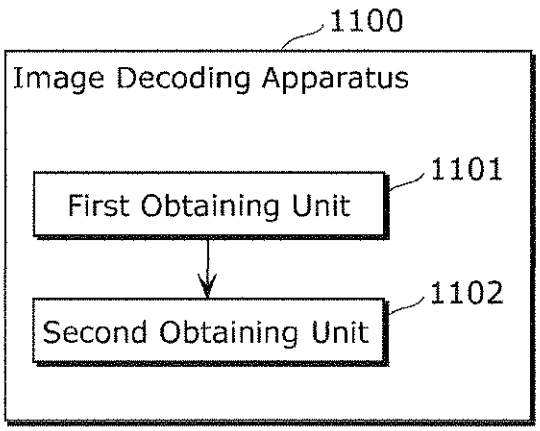


FIG. 11B

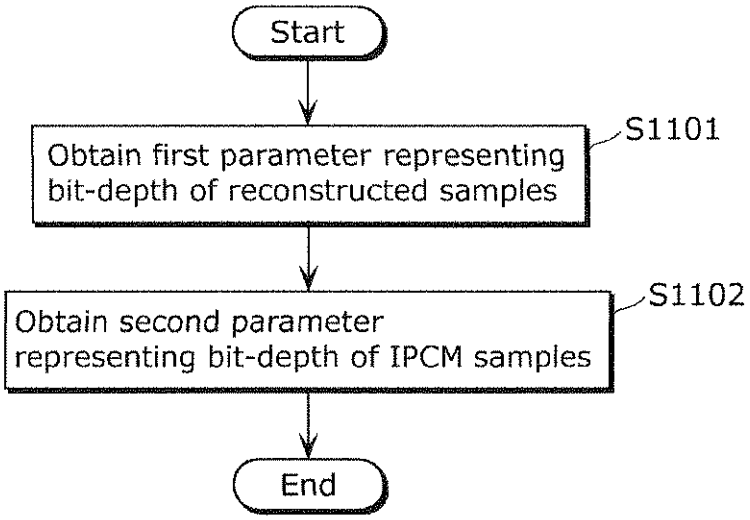

Start
Obtain first parameter representing bit-depth of reconstructed samples
S1101
Obtain second parameter representing bit-depth of IPCM samples
S1102
End

FIG. 12

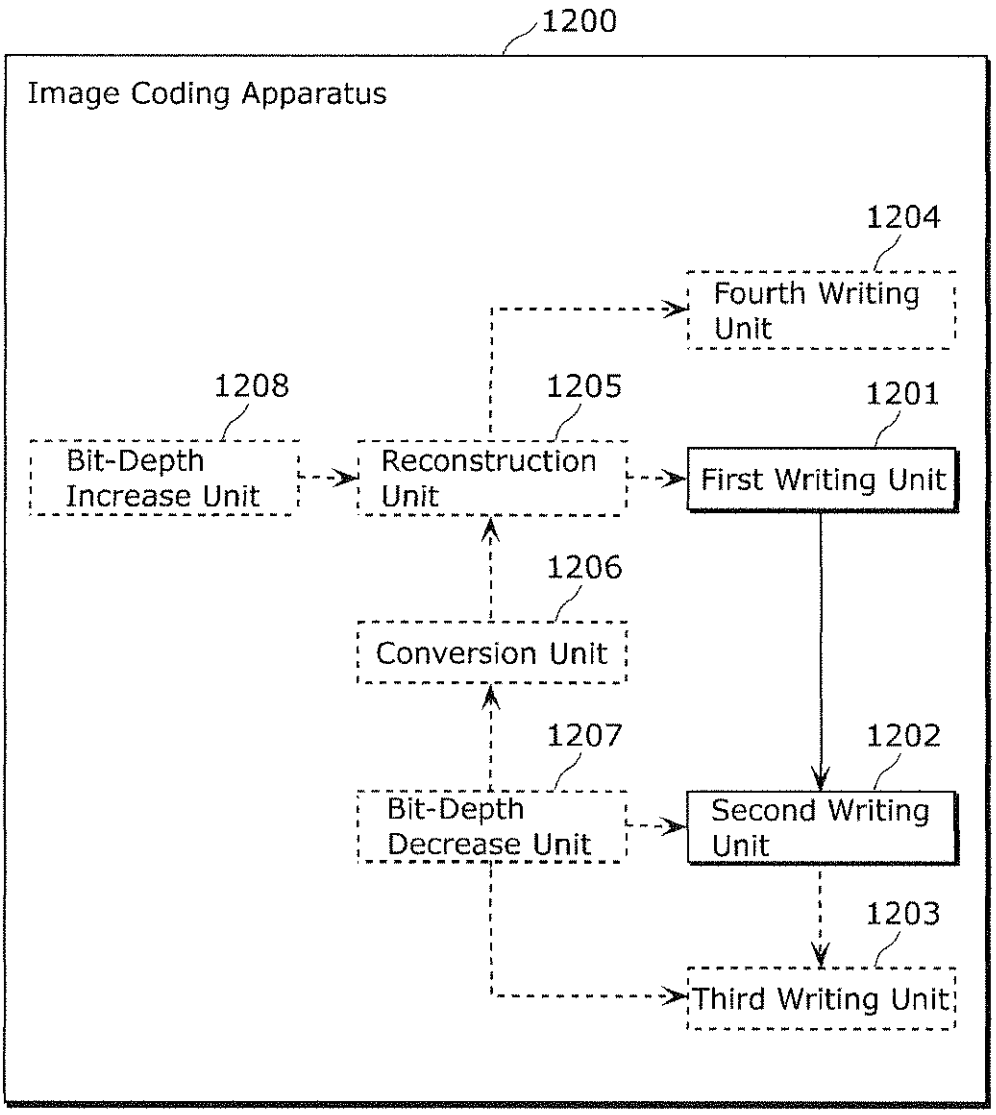

1200
Image Coding Apparatus
1204
Fourth Writing Unit
1208
1205
1201
Bit-Depth Increase Unit
Reconstruction Unit
First Writing Unit
1206
Conversion Unit
1207
1202
Bit-Depth Decrease Unit
Second Writing Unit
1203
Third Writing Unit

FIG. 13

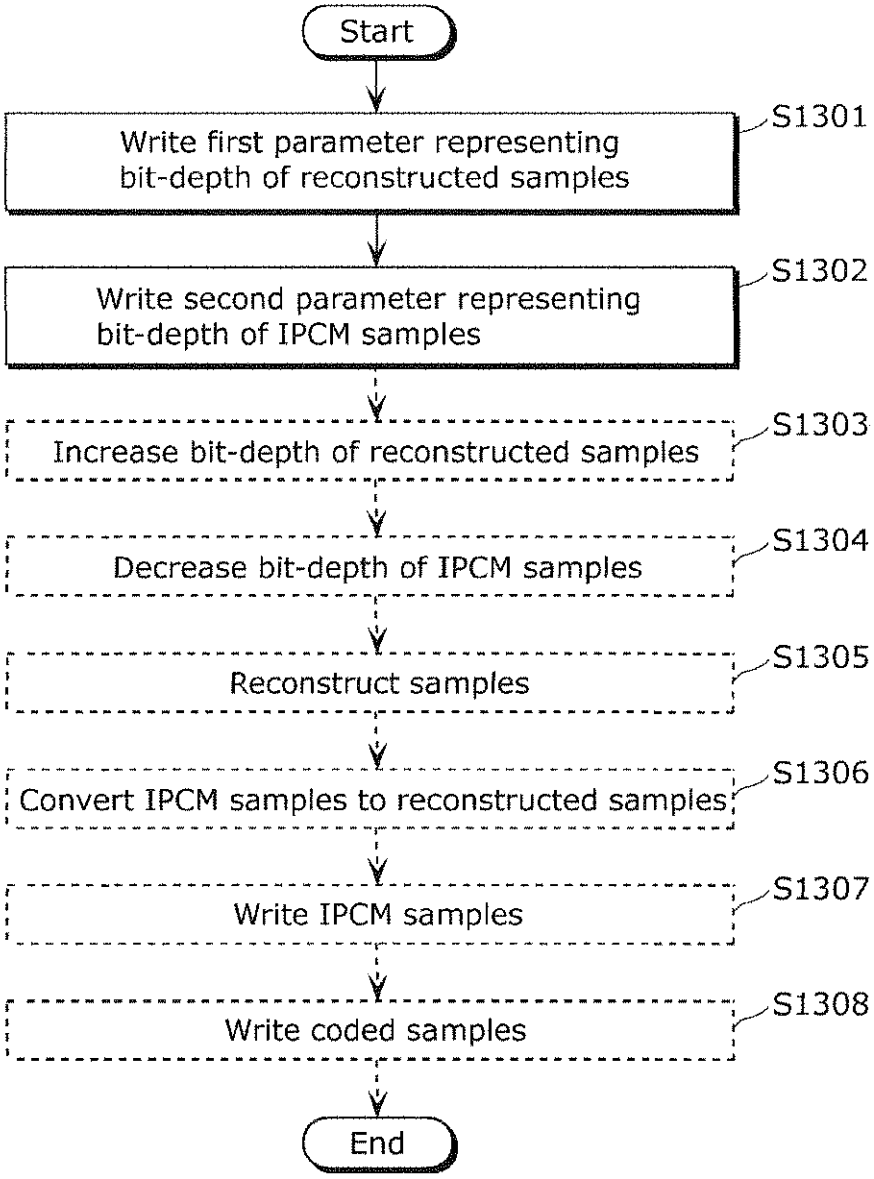

Start
Write first parameter representing bit-depth of reconstructed samples
S1301
Write second parameter representing bit-depth of IPCM samples
S1302
Increase bit-depth of reconstructed samples
S1303
Decrease bit-depth of IPCM samples
S1304
Reconstruct samples
S1305
Convert IPCM samples to reconstructed samples
S1306
Write IPCM samples
S1307
Write coded samples
S1308
End

FIG. 14

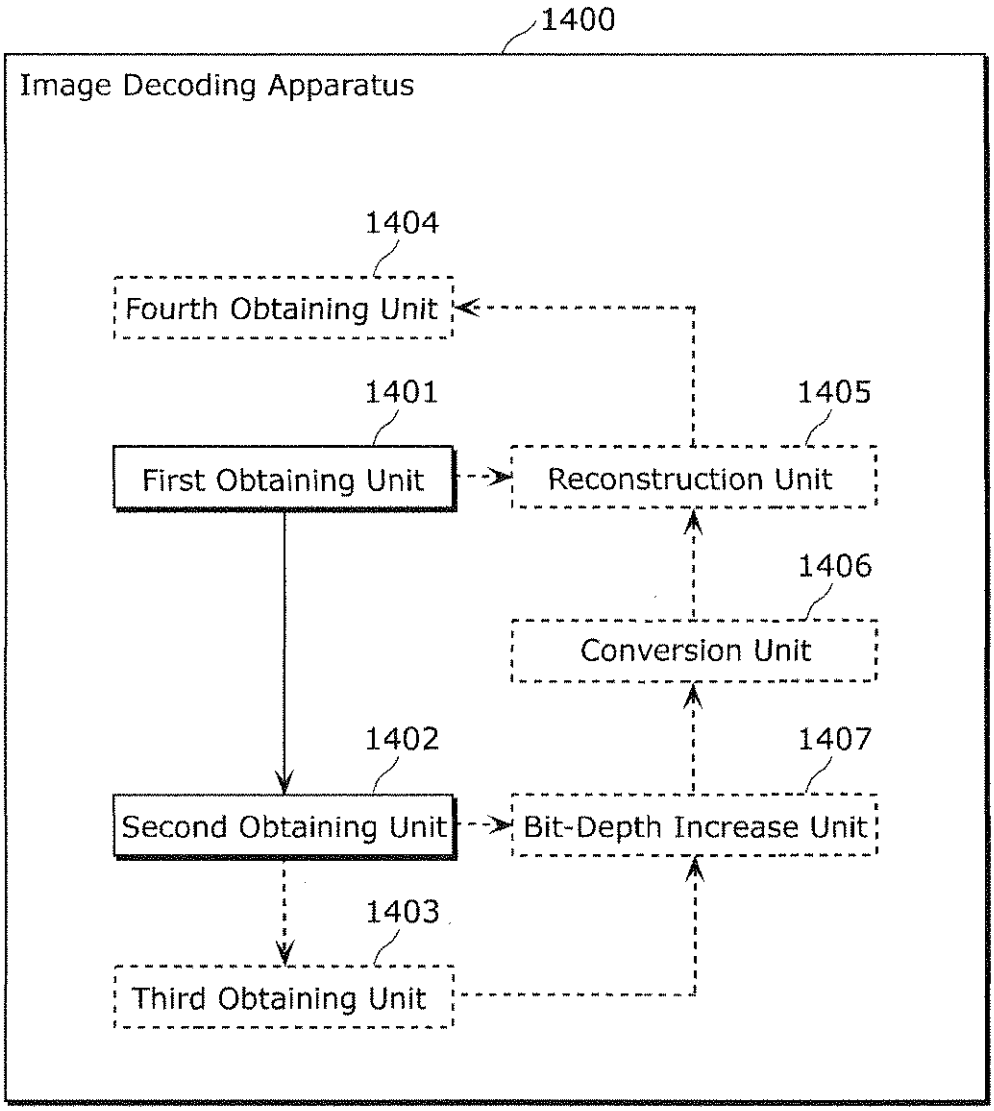

1400
Image Decoding Apparatus
1404
Fourth Obtaining Unit
1401
First Obtaining Unit
1405
Reconstruction Unit
1406
Conversion Unit
1402
Second Obtaining Unit
1407
Bit-Depth Increase Unit
1403
Third Obtaining Unit

FIG. 15

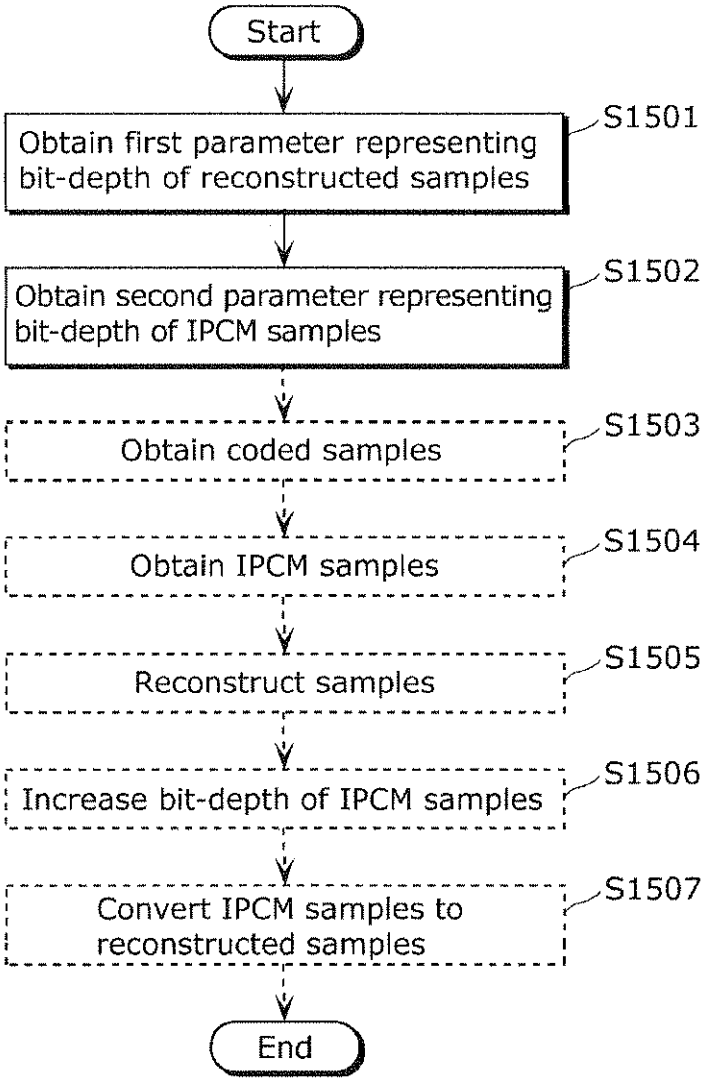

Start
Obtain first parameter representing bit-depth of reconstructed samples
S1501
Obtain second parameter representing bit-depth of IPCM samples
S1502
Obtain coded samples
S1503
Obtain IPCM samples
S1504
Reconstruct samples
S1505
Increase bit-depth of IPCM samples
S1506
Convert IPCM samples to reconstructed samples
S1507
End

FIG. 16

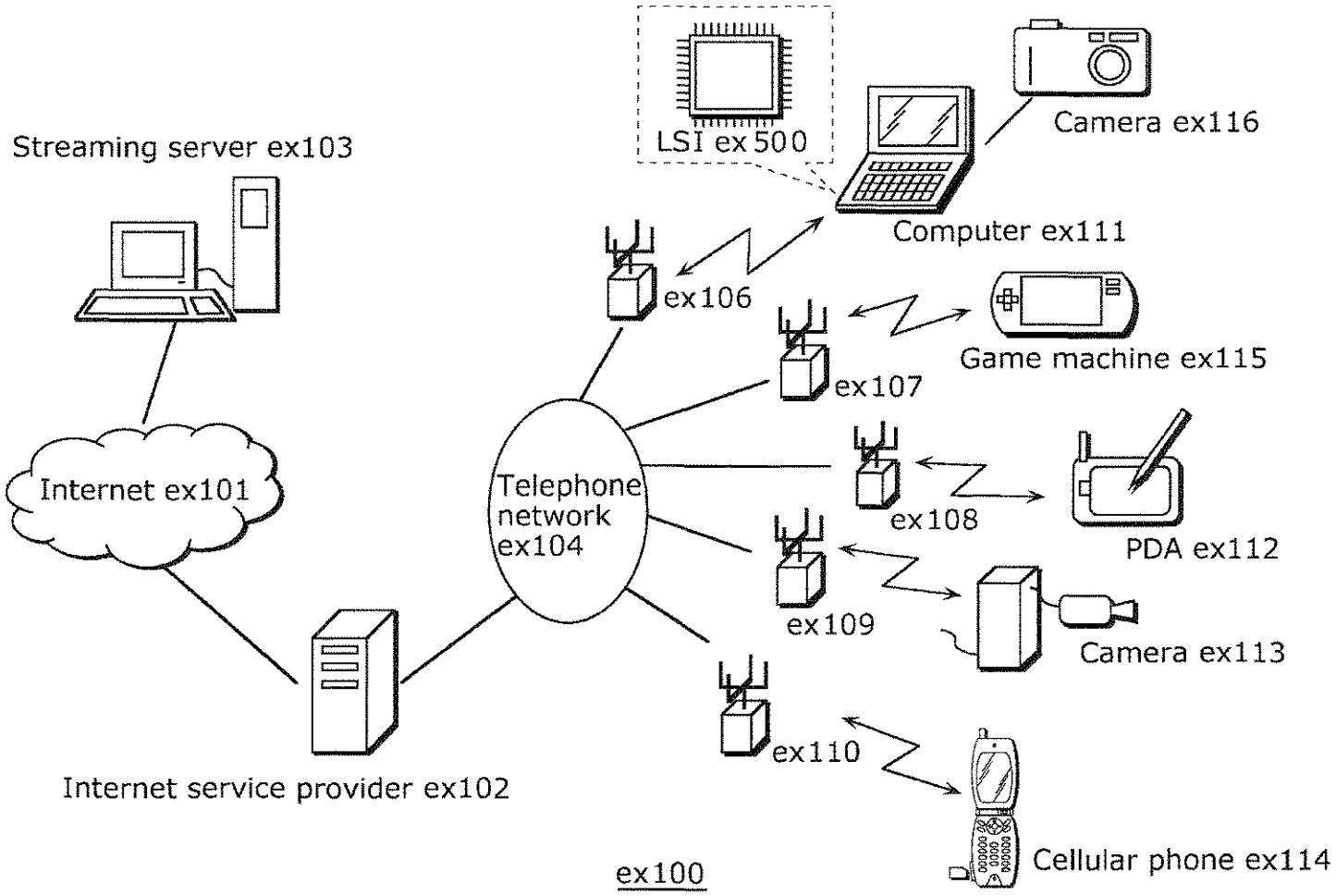

LSI ex500
Camera ex116
Streaming server ex103
Computer ex111
ex106
Game machine ex115
ex107
Internet ex101
Telephone network ex104
ex108
PDA ex112
ex109
Camera ex113
ex110
Internet service provider ex102
Cellular phone ex114
ex100

FIG. 17

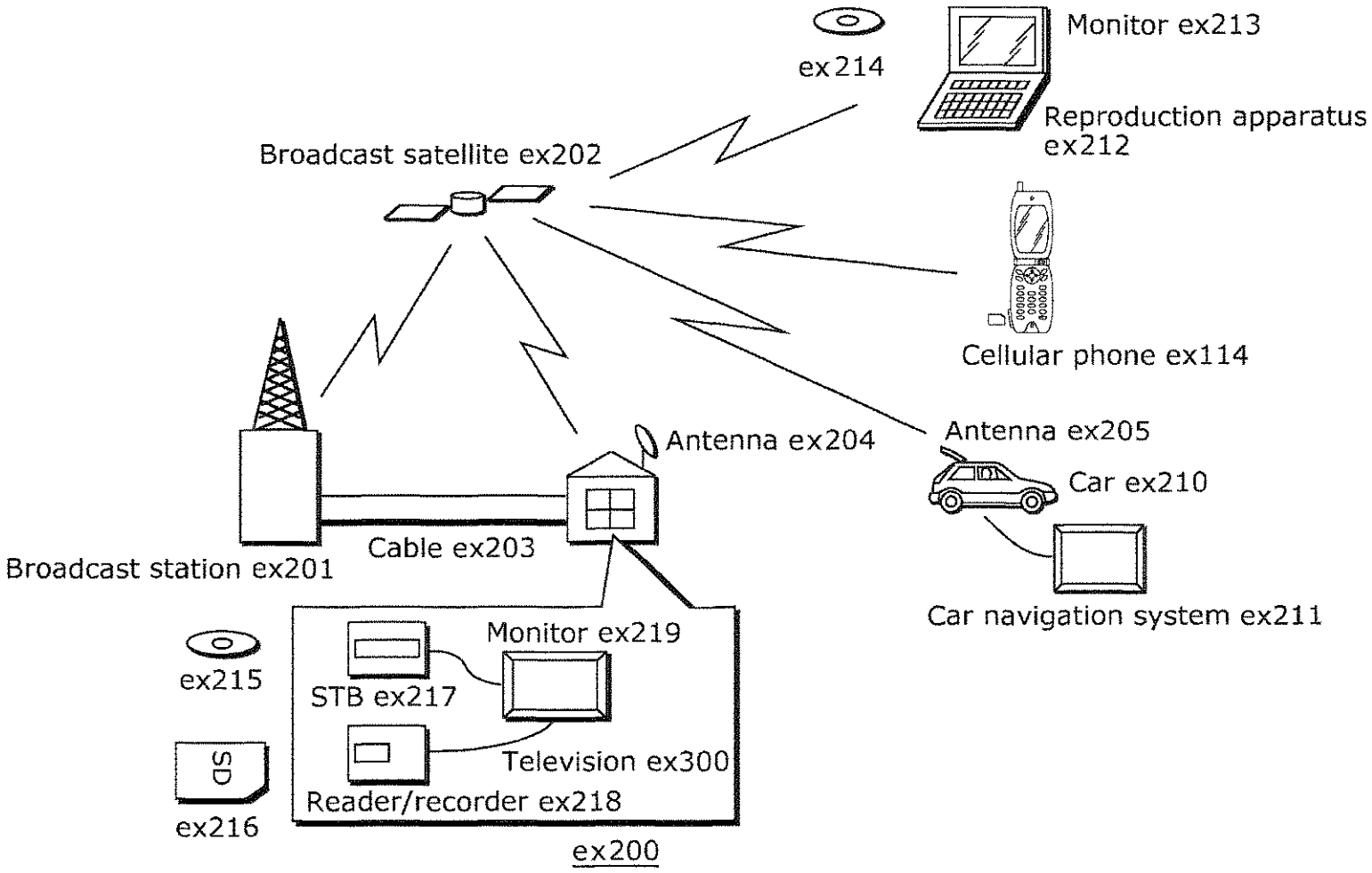

ex214
Monitor ex213
Reproduction apparatus ex212
Broadcast satellite ex202
Cellular phone ex114
Antenna ex204
Antenna ex205
Car ex210
Broadcast station ex201
Cable ex203
Car navigation system ex211
Monitor ex219
ex215
STB ex217
SD
Television ex300
Reader/recorder ex218
ex216
ex200

FIG. 18

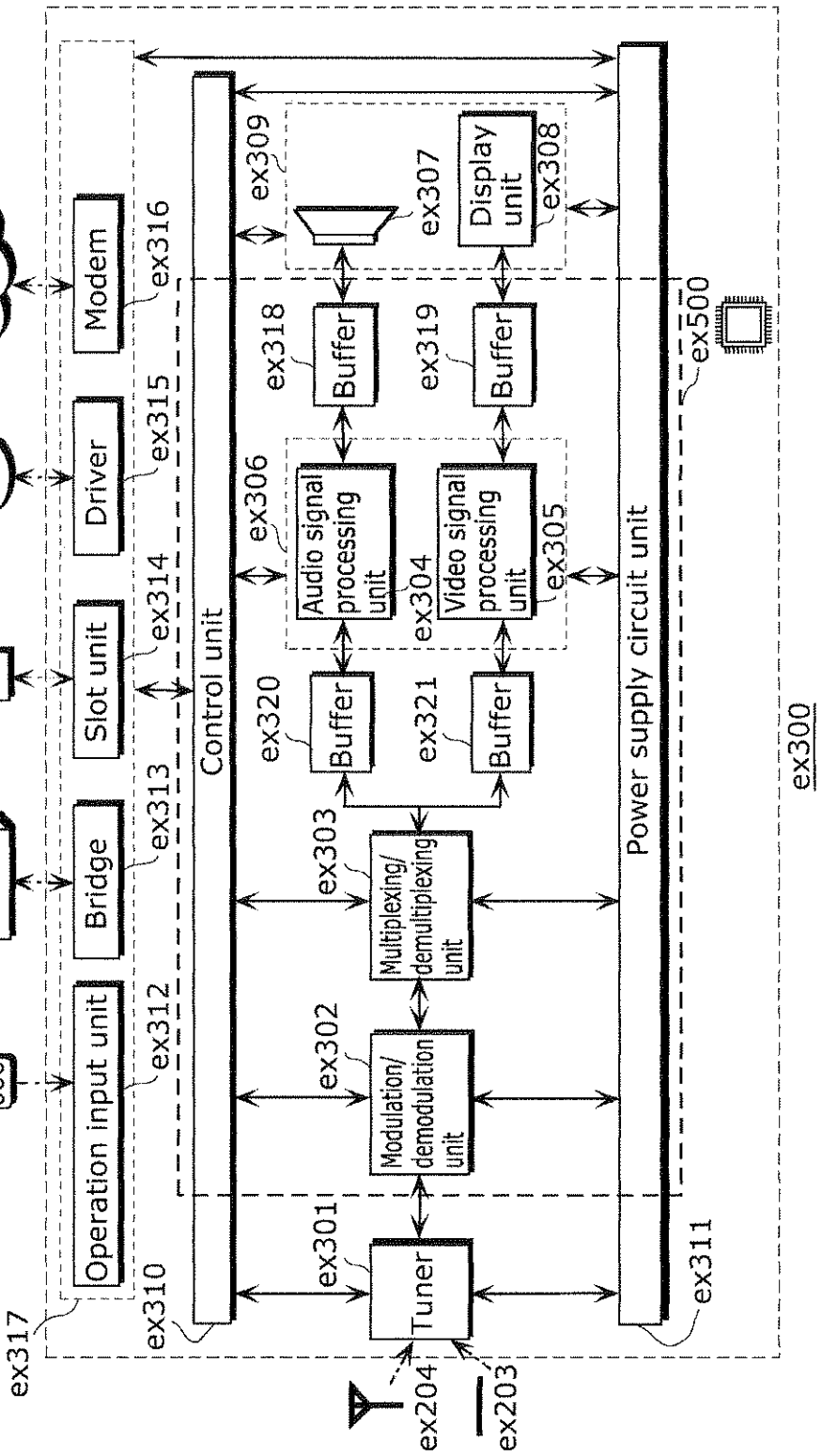

ex104
Telephone network
ex215
ex216
SD
ex218
ex220
ex317
Operation input unit
ex312
Bridge
ex313
Slot unit
ex314
Driver
ex315
Modem
ex316
ex310
Control unit
ex309
ex307
Display unit
ex308
ex318
Buffer
ex319
Buffer
ex306
Audio signal processing unit
ex304
Video signal processing unit
ex305
ex320
Buffer
ex321
Buffer
ex303
Multiplexing/ demultiplexing unit
ex302
Modulation/ demodulation unit
ex301
Tuner
ex204
ex203
Power supply circuit unit
ex311
ex500
ex300

FIG. 19

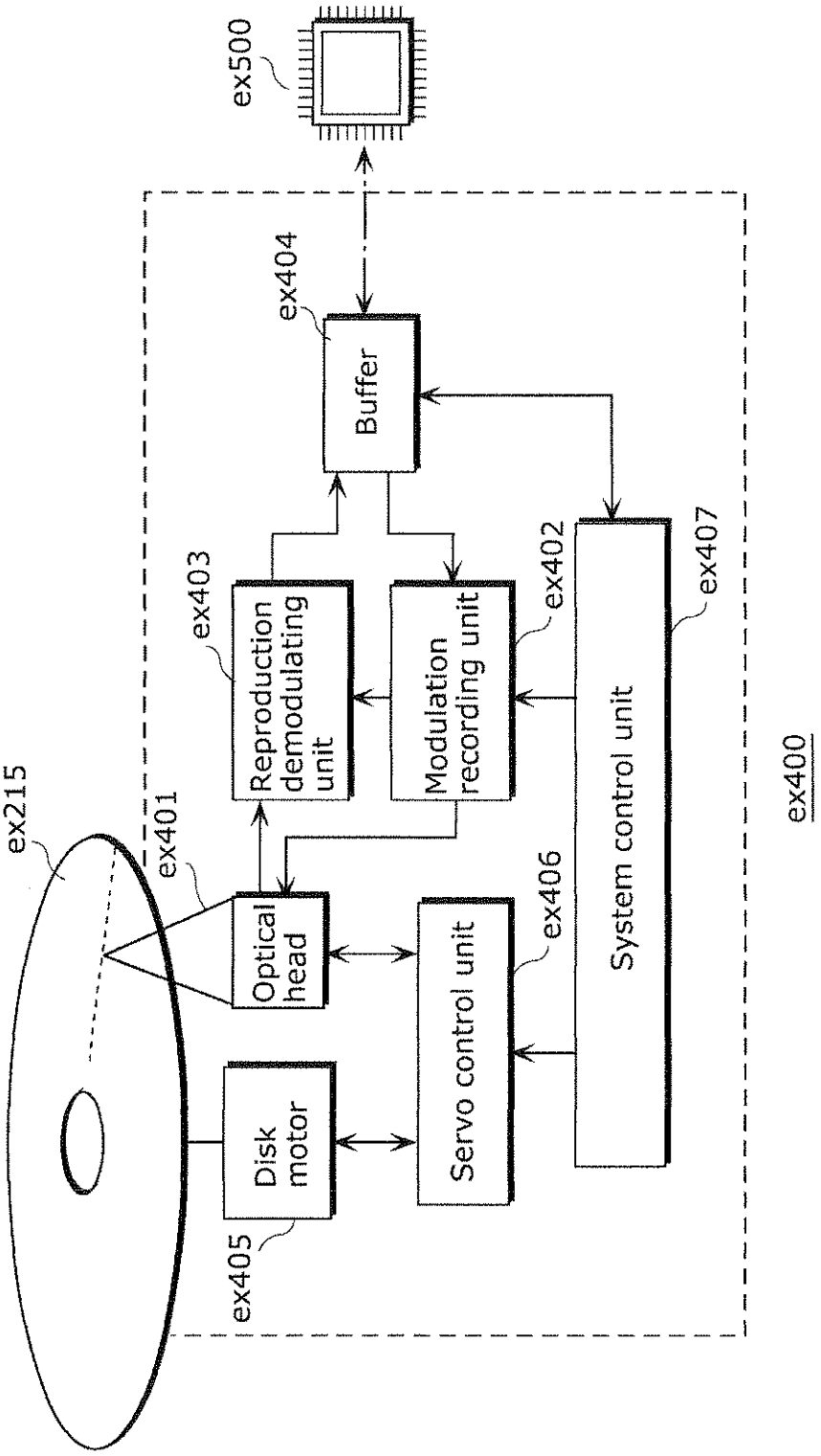

ex500
ex404
Buffer
ex403
Reproduction demodulating unit
Modulation recording unit
ex402
ex407
System control unit
ex215
ex401
Optical head
ex406
Servo control unit
Disk motor
ex405
ex400

FIG. 20

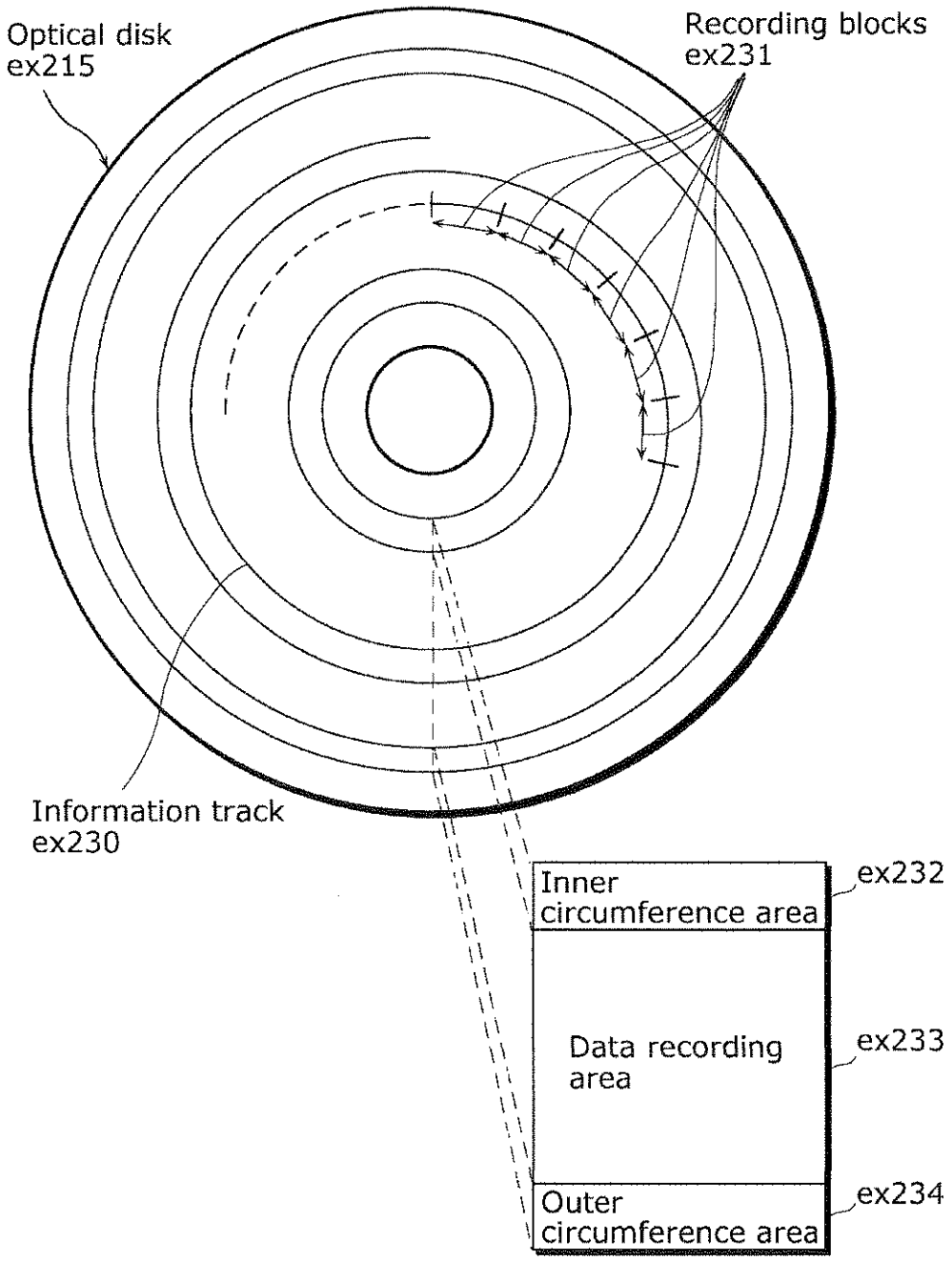

Optical disk
ex215
Recording blocks
ex231
Information track
ex230
Inner
circumference area
ex232
Data recording
area
ex233
Outer
circumference area
ex234

FIG. 21A

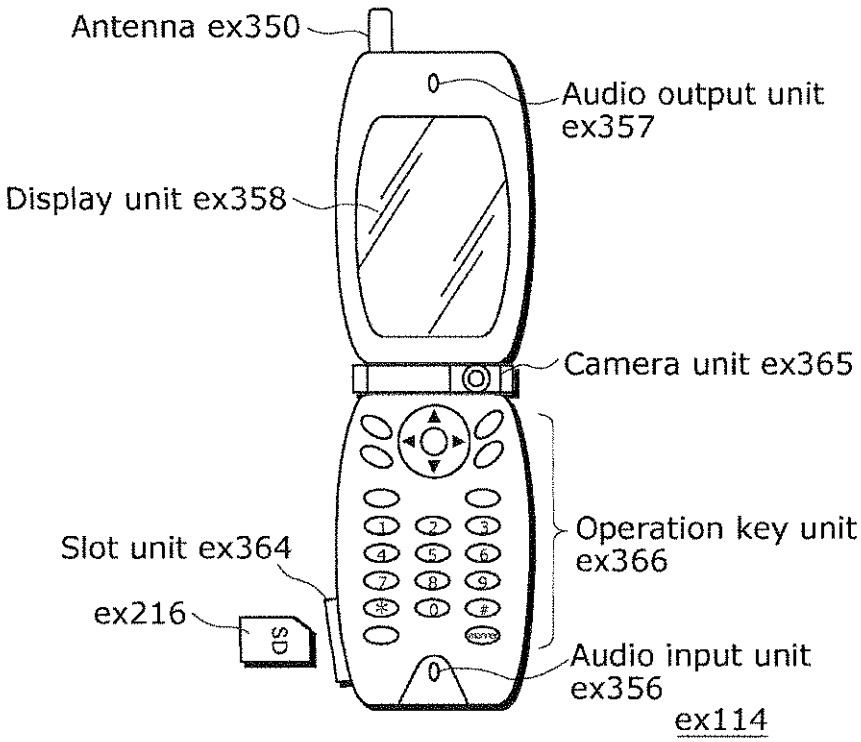


FIG. 21B

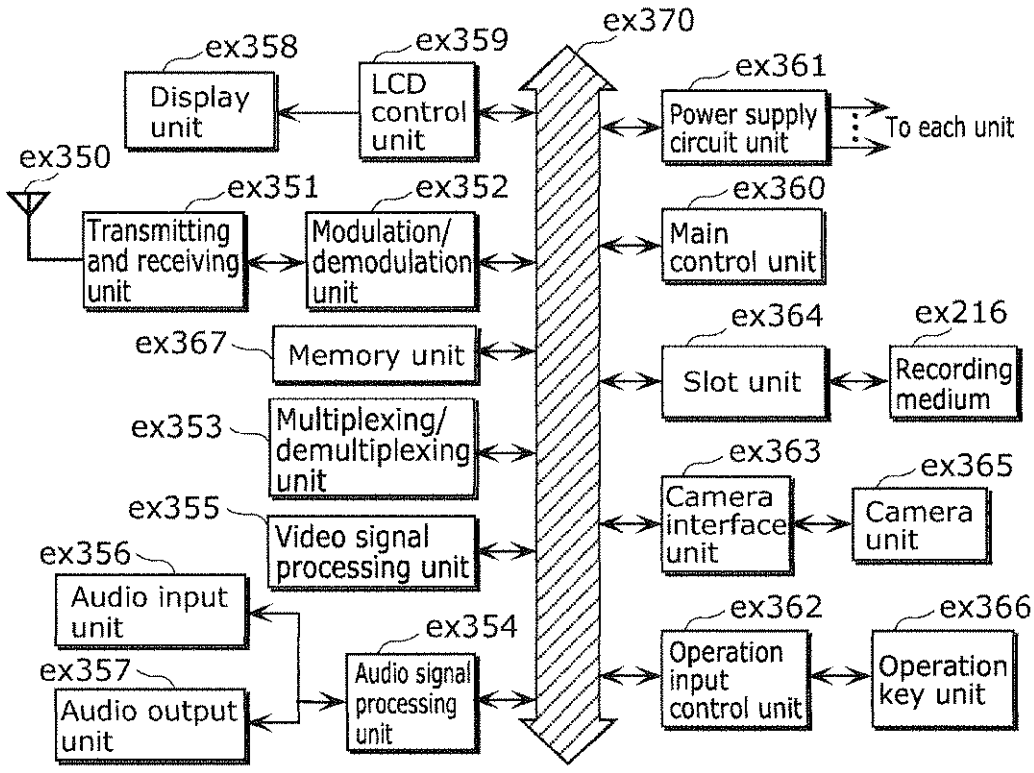


FIG. 22

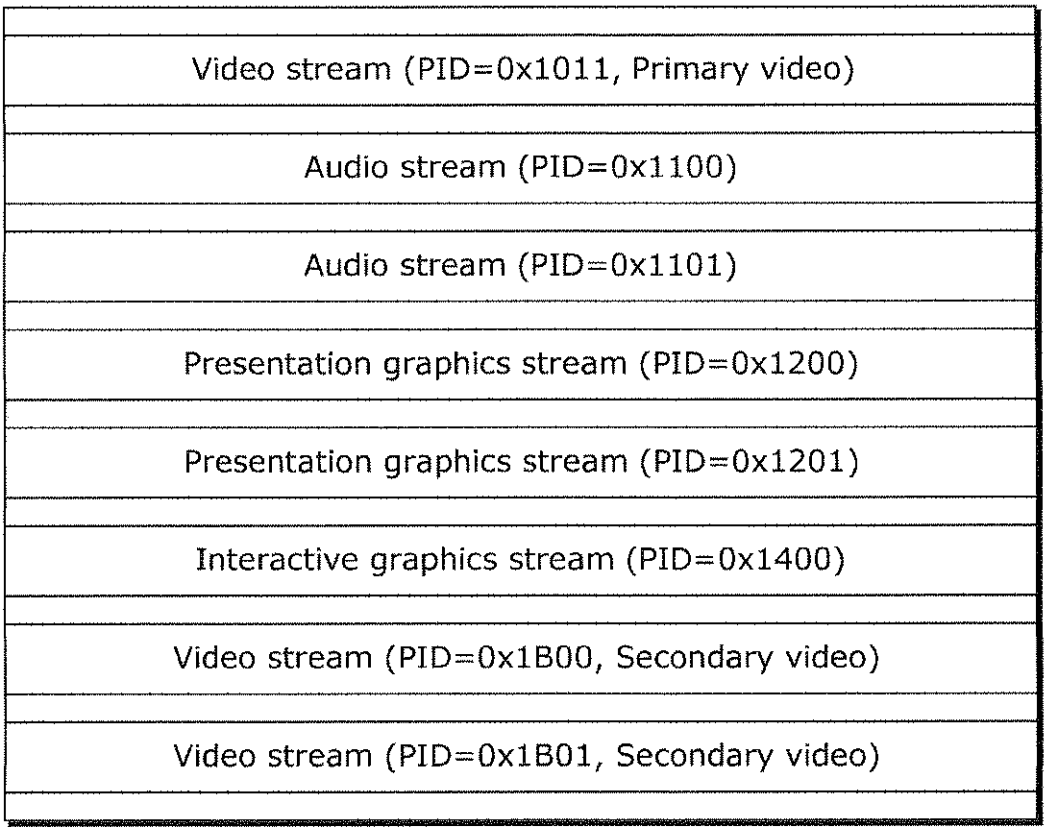

Video stream (PID=0x1011, Primary video)
Audio stream (PID=0x1100)
Audio stream (PID=0x1101)
Presentation graphics stream (PID=0x1200)
Presentation graphics stream (PID=0x1201)
Interactive graphics stream (PID=0x1400)
Video stream (PID=0x1B00, Secondary video)
Video stream (PID=0x1B01, Secondary video)

FIG. 23

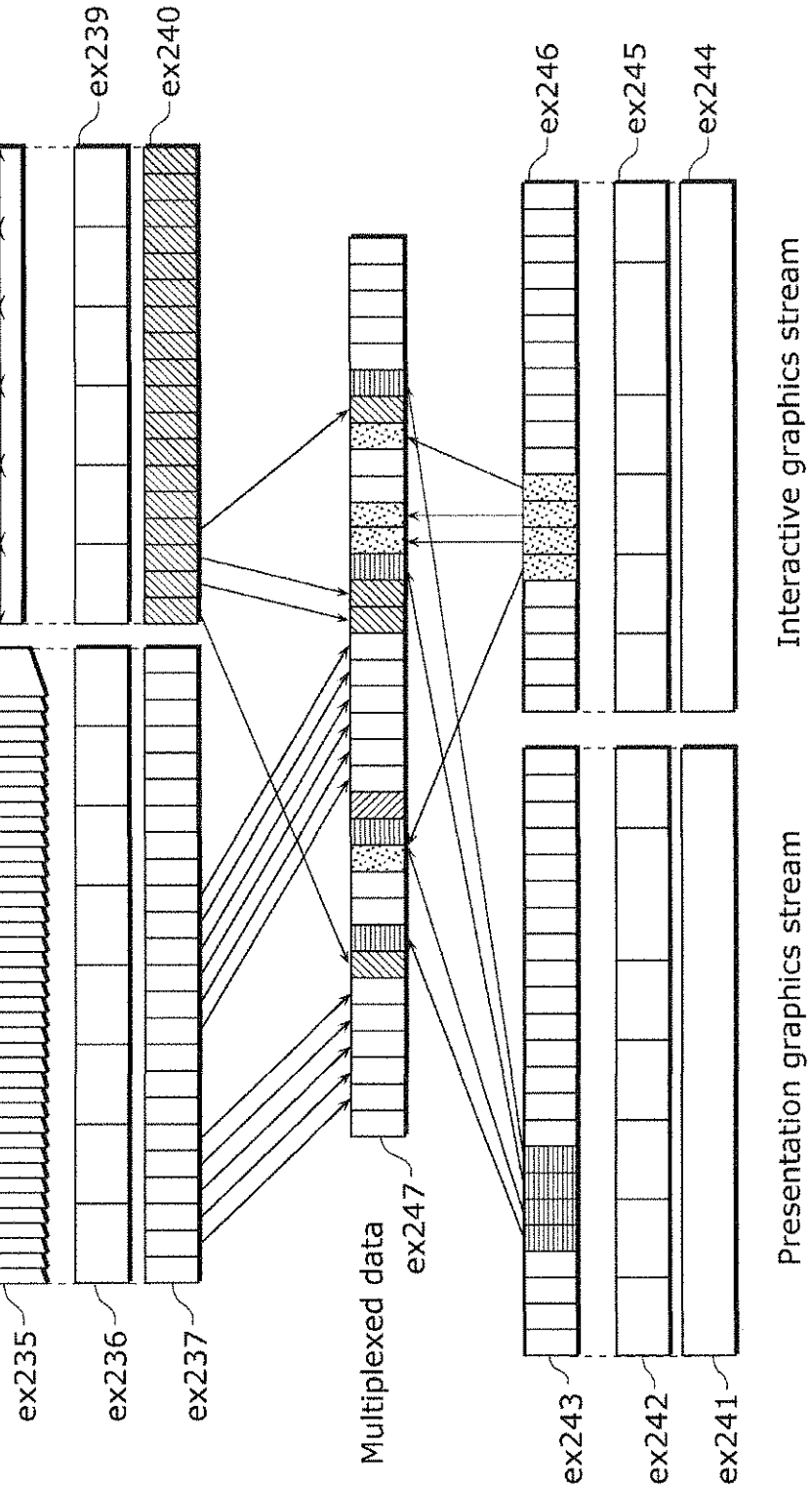

Video frame stream
Audio frame stream
Interactive graphics stream
Presentation graphics stream
Multiplexed data
ex235
ex236
ex237
ex238
ex239
ex240
ex241
ex242
ex243
ex244
ex245
ex246
ex247

FIG. 24

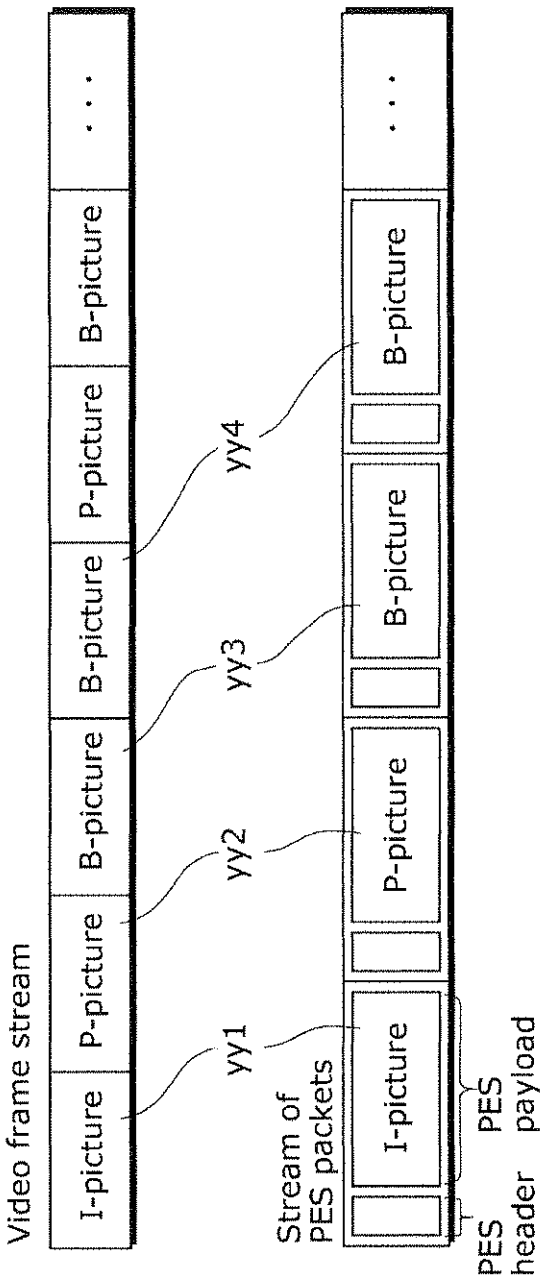

Video frame stream
I-picture
P-picture
B-picture
B-picture
P-picture
B-picture
. . .
yy1
yy2
yy3
yy4
Stream of PES packets
I-picture
P-picture
B-picture
B-picture
. . .
PES header
PES payload

FIG. 25

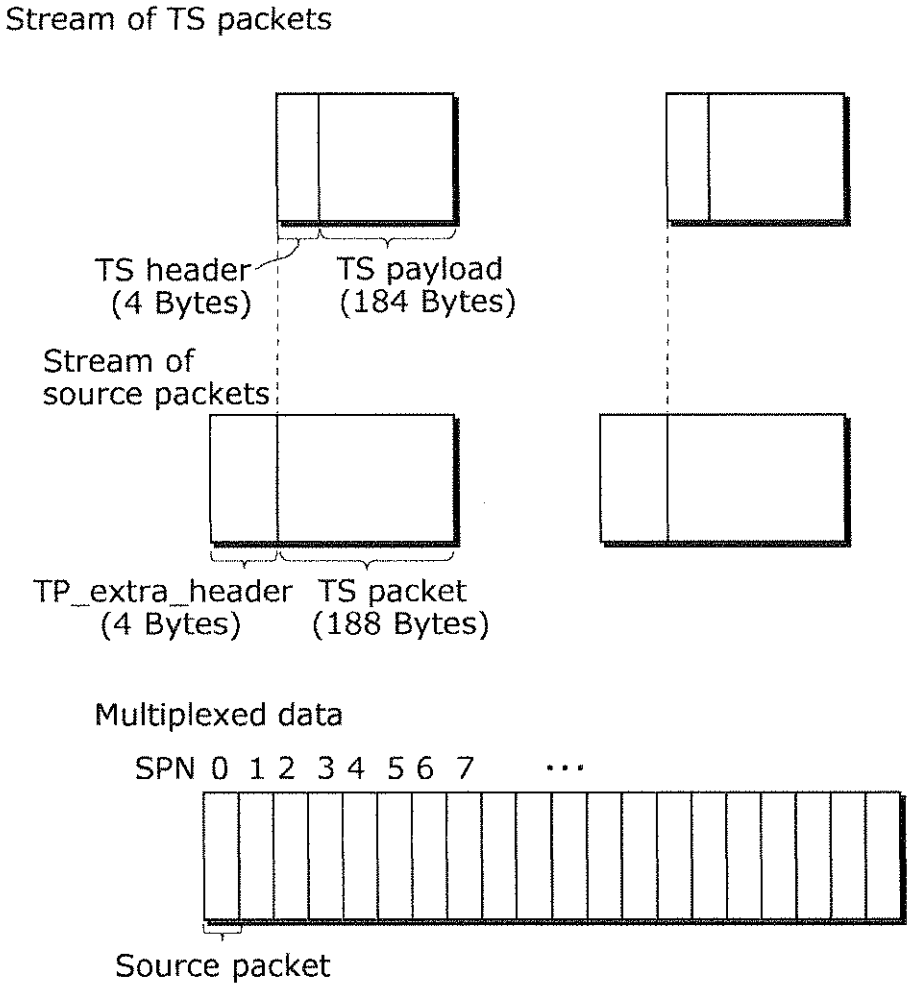

Stream of TS packets
TS header
(4 Bytes)
TS payload
(184 Bytes)
Stream of
source packets
TP_extra_header
(4 Bytes)
TS packet
(188 Bytes)
Multiplexed data
SPN 0 1 2 3 4 5 6 7 ...
Source packet

FIG. 26

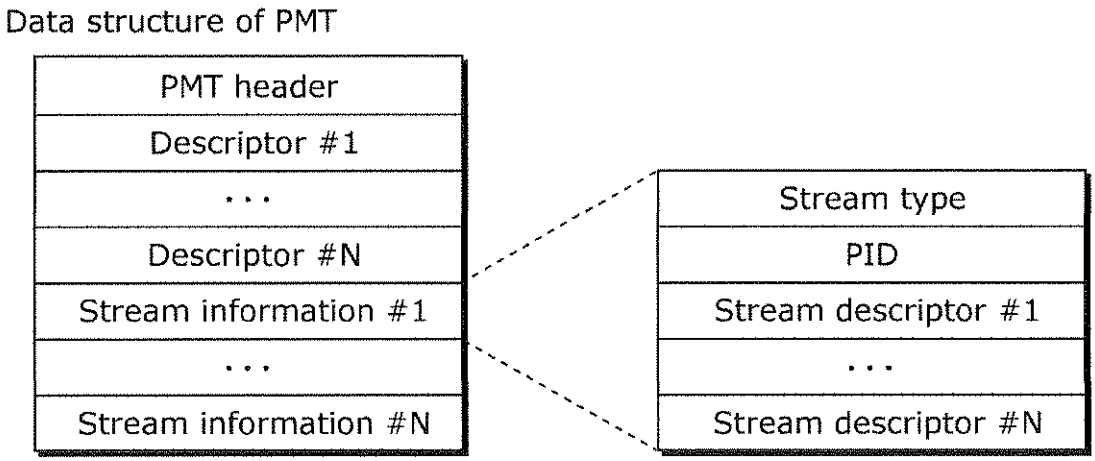

Data structure of PMT
PMT header
Descriptor #1
...
Descriptor #N
Stream information #1
...
Stream information #N
Stream type
PID
Stream descriptor #1
...
Stream descriptor #N

FIG. 27

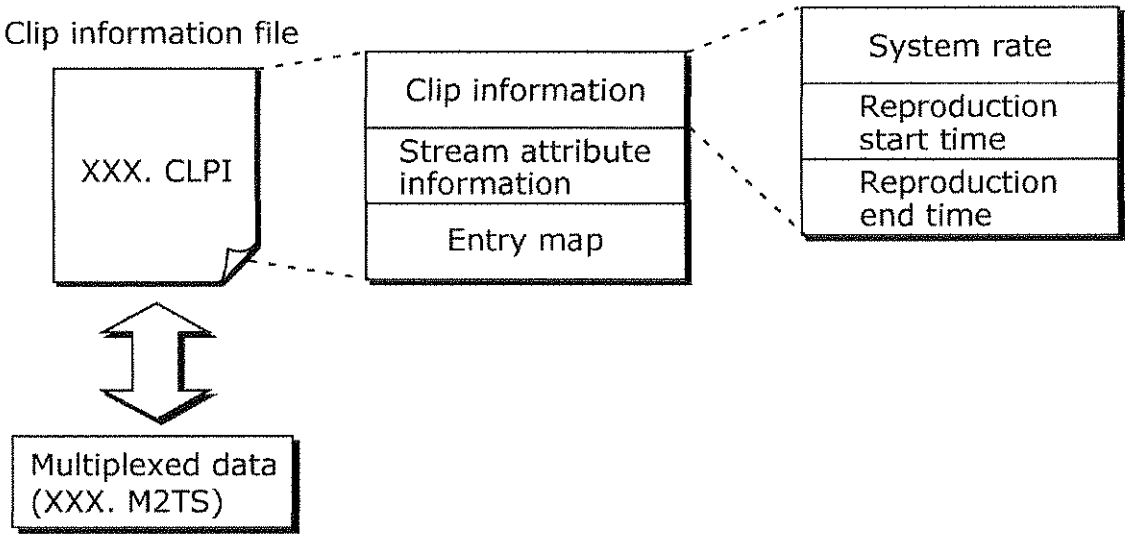

Clip information file
XXX. CLPI
Clip information
Stream attribute information
Entry map
System rate
Reproduction start time
Reproduction end time
Multiplexed data (XXX. M2TS)

FIG. 28

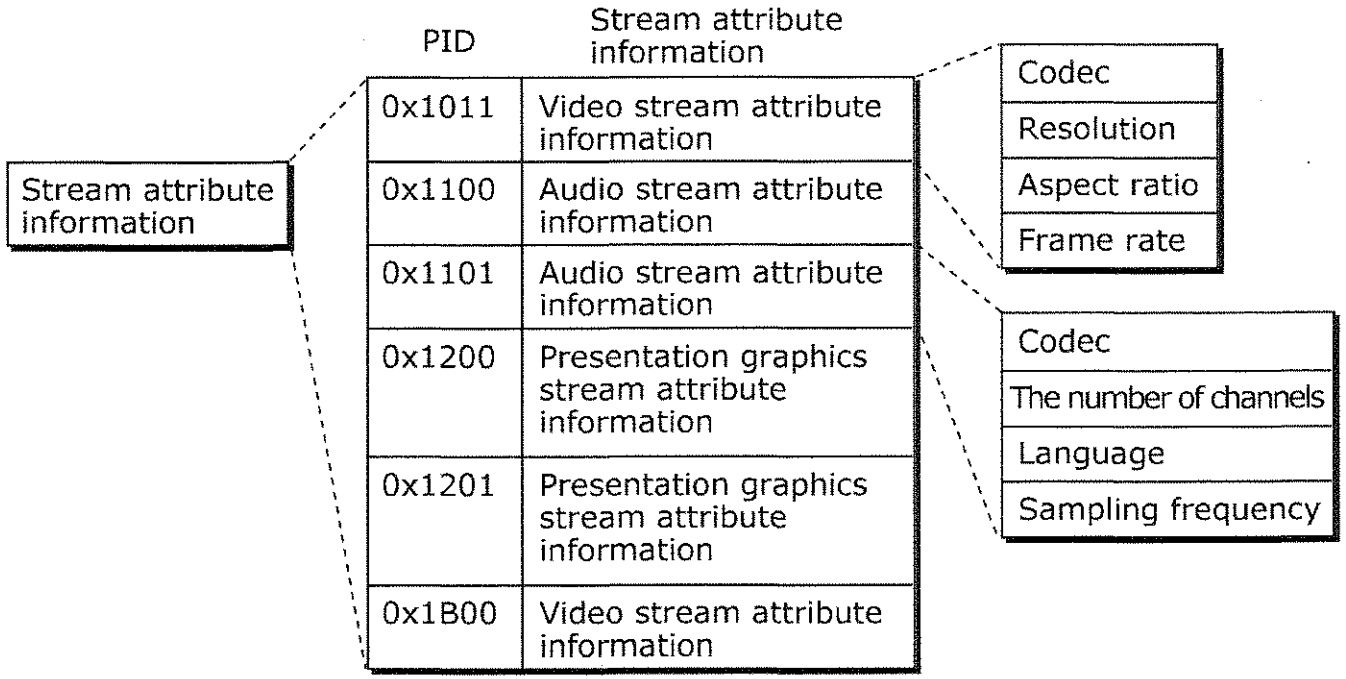

Stream attribute information
PID
Stream attribute information
0x1011
Video stream attribute information
0x1100
Audio stream attribute information
0x1101
Audio stream attribute information
0x1200
Presentation graphics stream attribute information
0x1201
Presentation graphics stream attribute information
0x1B00
Video stream attribute information
Codec
Resolution
Aspect ratio
Frame rate
Codec
The number of channels
Language
Sampling frequency

FIG. 29

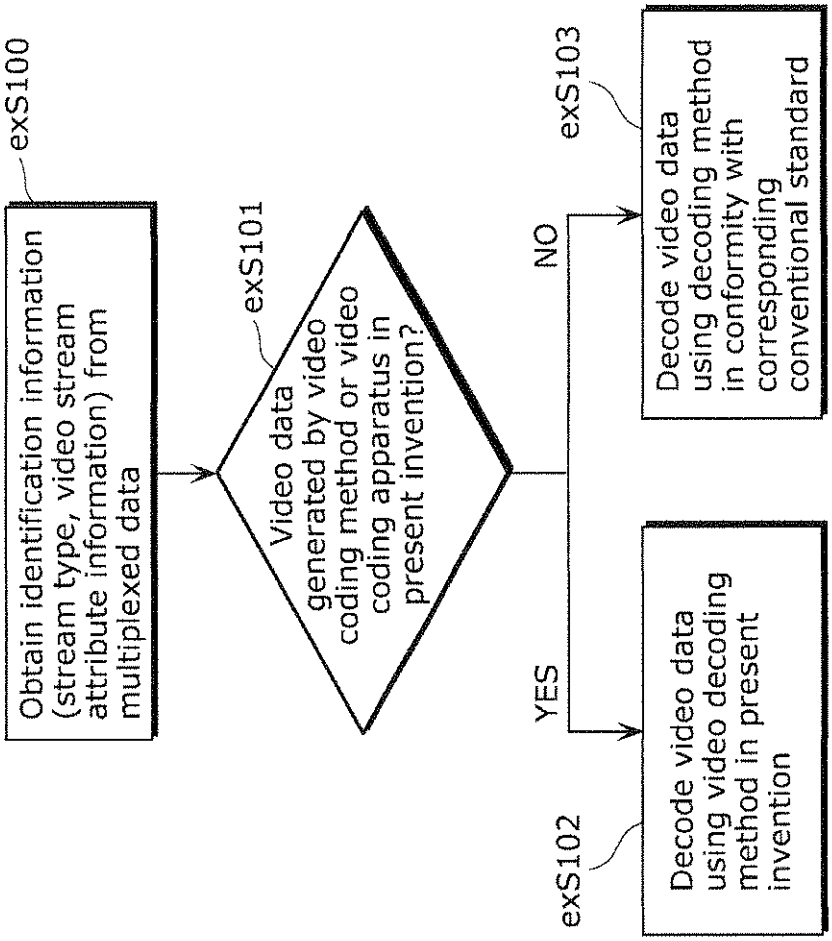

exS100
Obtain identification information (stream type, video stream attribute information) from multiplexed data
exS101
Video data generated by video coding method or video coding apparatus in present invention?
YES
NO
exS102
Decode video data using video decoding method in present invention
exS103
Decode video data using decoding method in conformity with corresponding conventional standard

FIG. 30

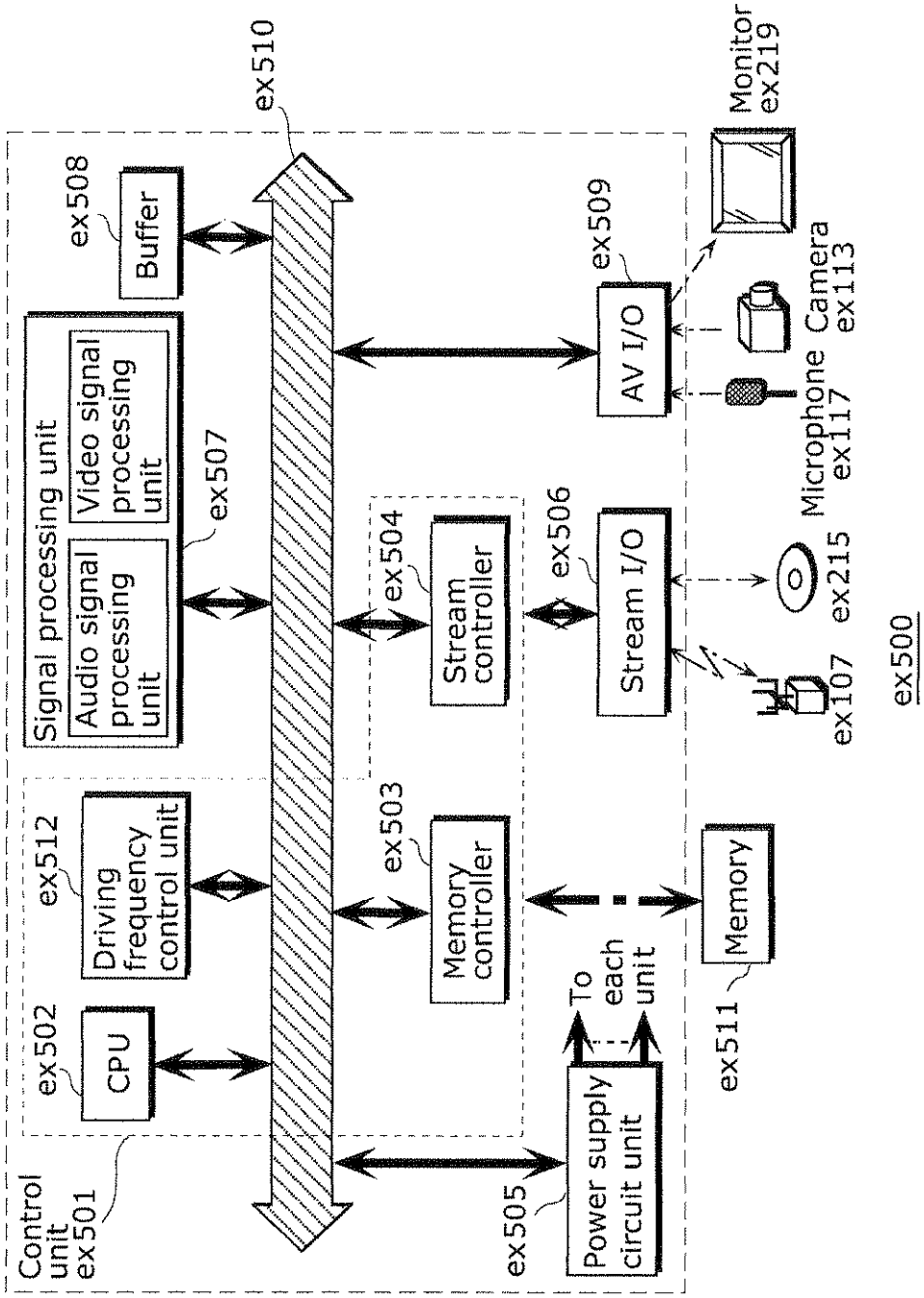

ex500
Control unit ex501
CPU
ex502
Driving frequency control unit
ex512
Signal processing unit
Audio signal processing unit
Video signal processing unit
ex507
Buffer
ex508
ex510
Monitor ex219
AV I/O
ex509
Microphone ex117
Camera ex113
Stream controller
ex504
Stream I/O
ex506
ex215
ex107
Memory controller
ex503
Memory
ex511
To each unit
Power supply circuit unit
ex505

FIG. 31

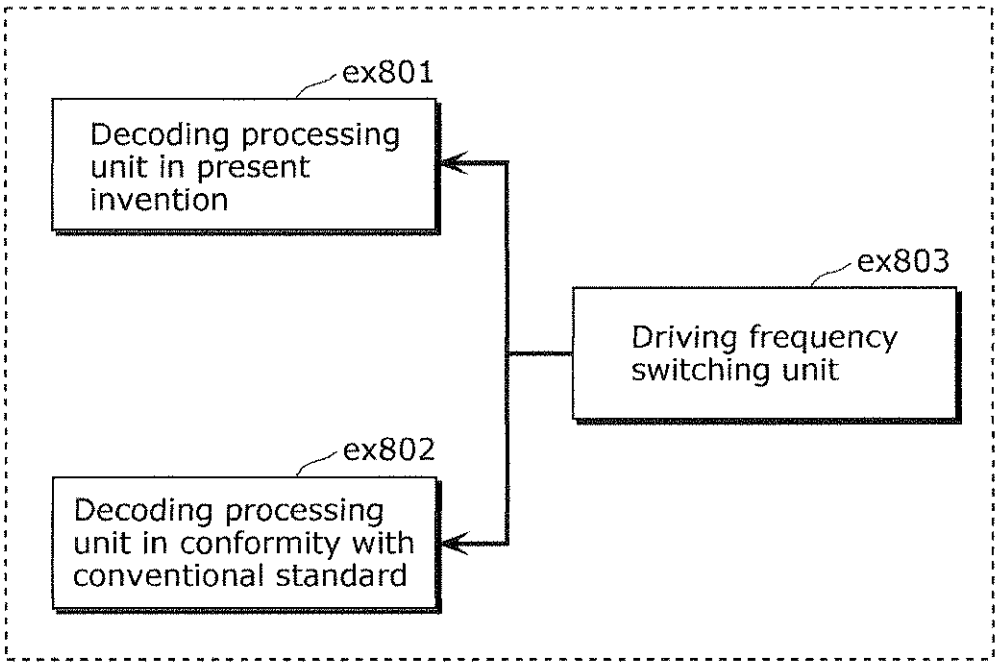

ex801
Decoding processing unit in present invention
ex803
Driving frequency switching unit
ex802
Decoding processing unit in conformity with conventional standard

FIG. 32

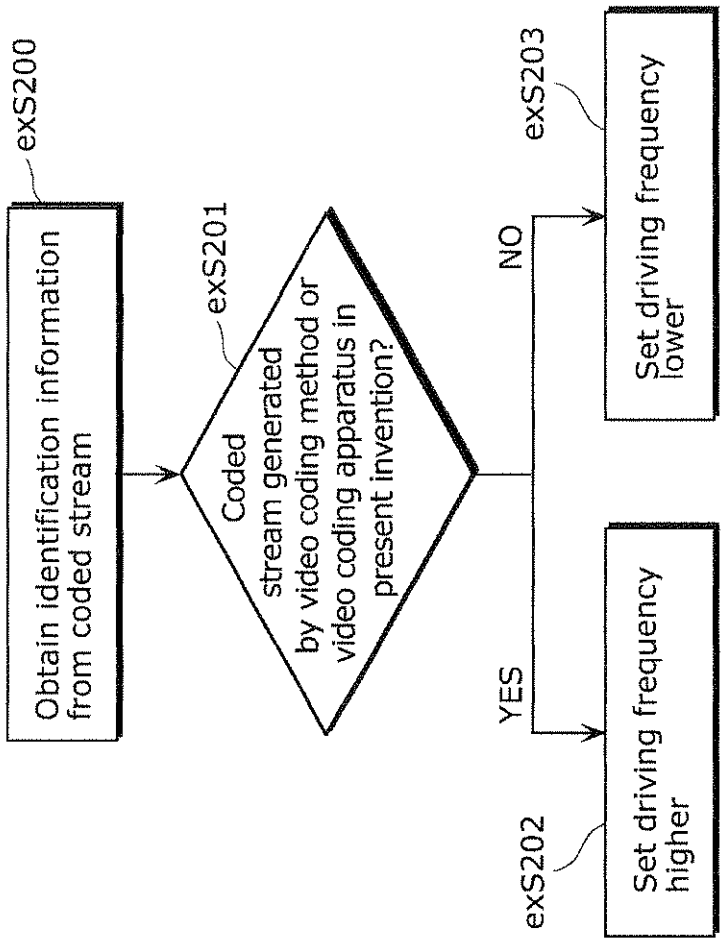

exS200
Obtain identification information from coded stream
exS201
Coded stream generated by video coding method or video coding apparatus in present invention?
YES
NO
exS202
Set driving frequency higher
exS203
Set driving frequency lower

FIG. 33

Corresponding standard	Driving frequency
MPEG-4 AVC	500 MHz
MPEG-2	350 MHz
⋮	⋮

FIG. 34A

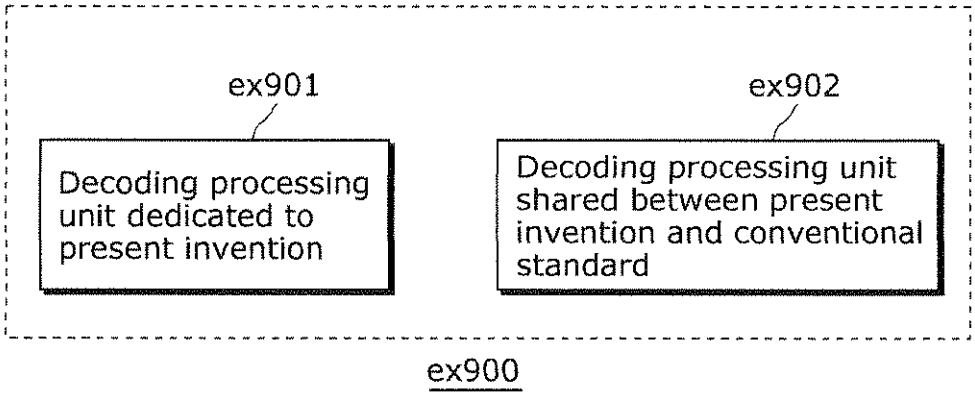


FIG. 34B

