FIG. 1

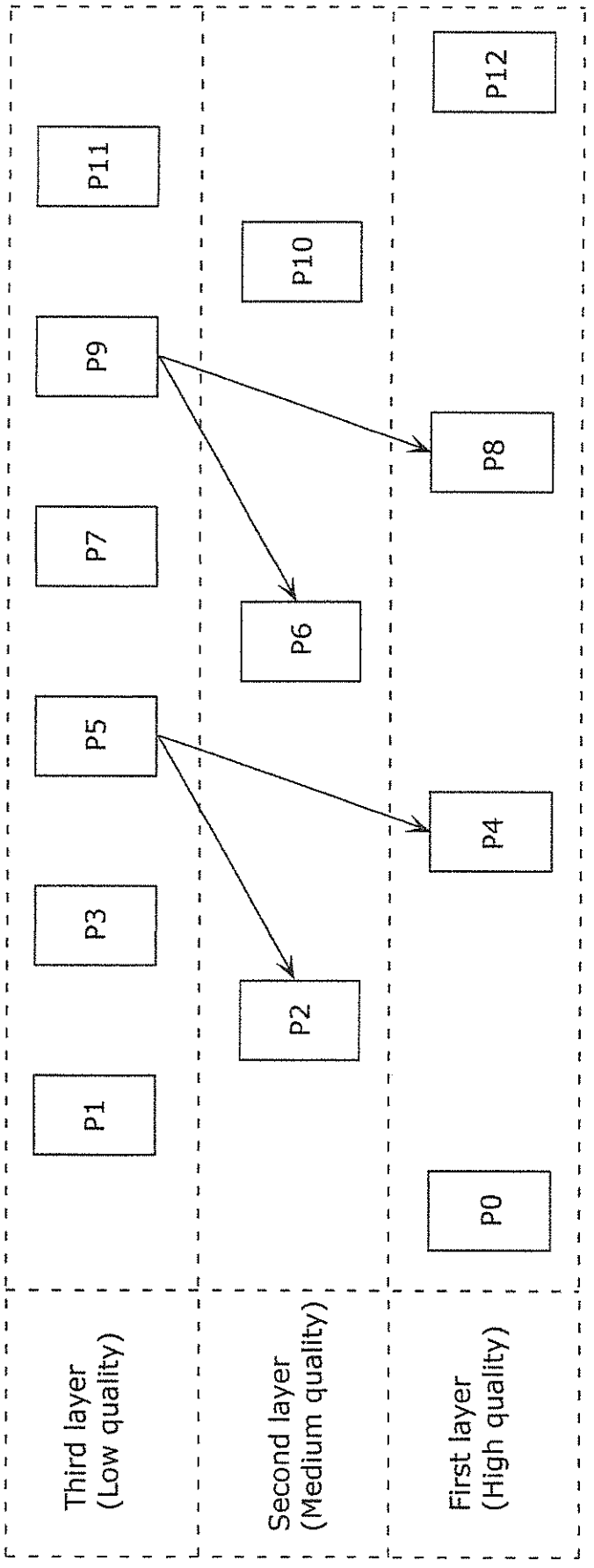

Third layer
(Low quality)
Second layer
(Medium quality)
First layer
(High quality)
P0
P1
P2
P3
P4
P5
P6
P7
P8
P9
P10
P11
P12

FIG. 2

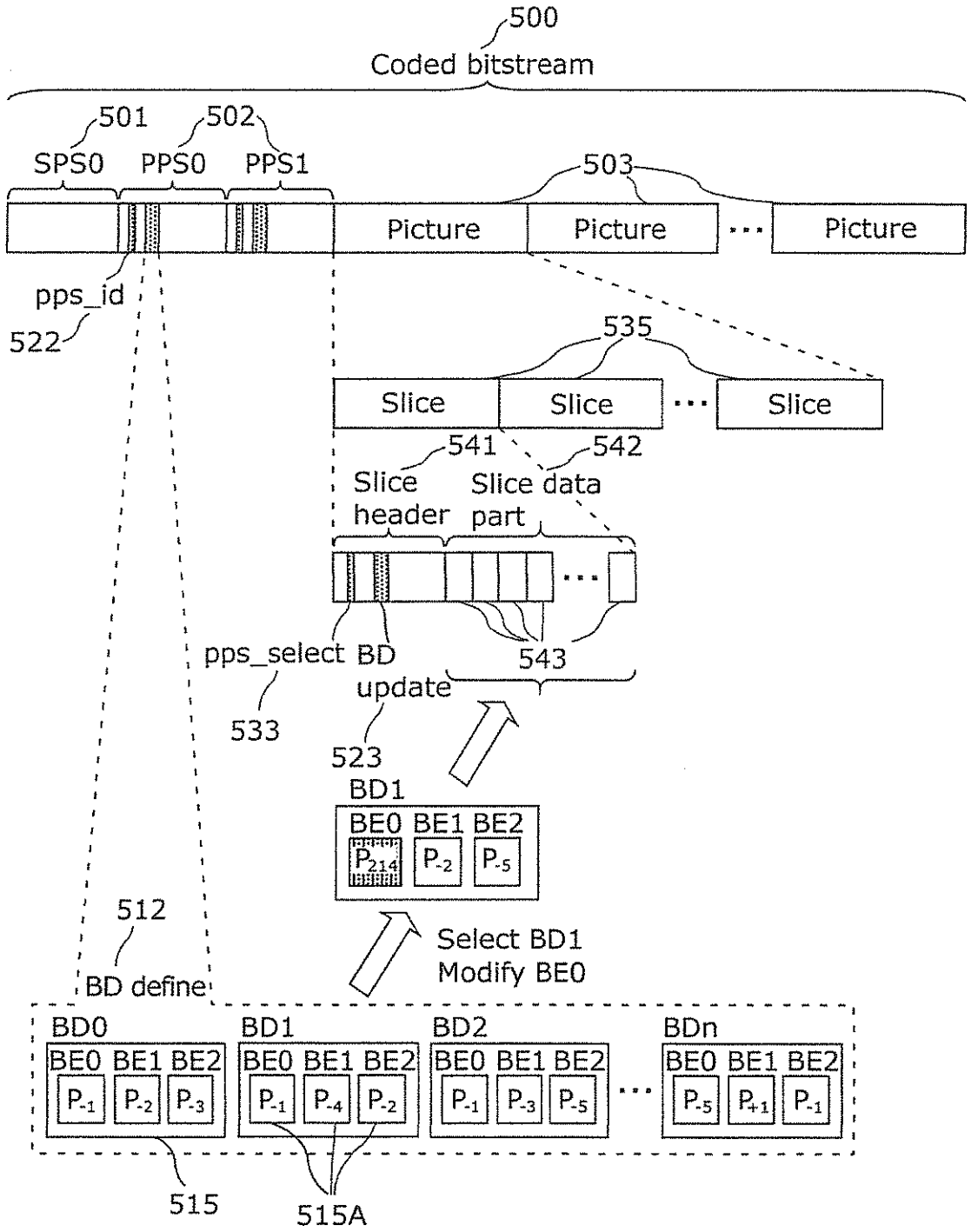

500
Coded bitstream
501
502
SPS0
PPS0
PPS1
503
Picture
Picture
Picture
pps_id
522
535
Slice
Slice
Slice
541
542
Slice header
Slice data part
pps_select
533
BD update
523
543
BD1
BE0 BE1 BE2
512
BD define
Select BD1
Modify BE0
BD0
BD1
BD2
BDn
BE0 BE1 BE2
515
515A

FIG. 3

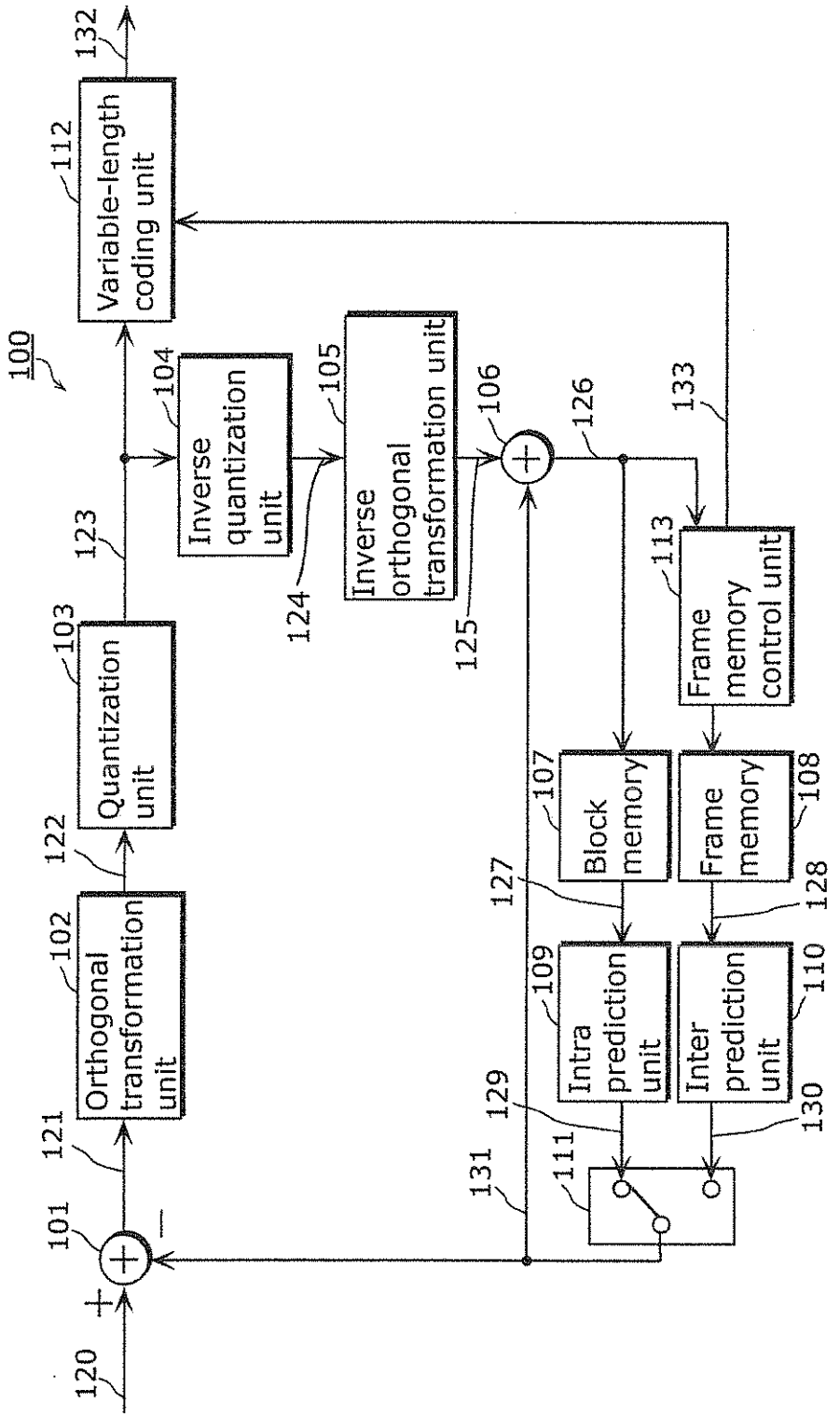

100
Variable-length coding unit
112
132
Inverse quantization unit
104
Inverse orthogonal transformation unit
105
106
Quantization unit
103
123
124
125
126
133
Frame memory control unit
113
Orthogonal transformation unit
102
122
Block memory
107
Frame memory
108
127
128
Intra prediction unit
109
Inter prediction unit
110
129
130
131
111
Orthogonal transformation unit
102
121
101
120
+
−

FIG. 4

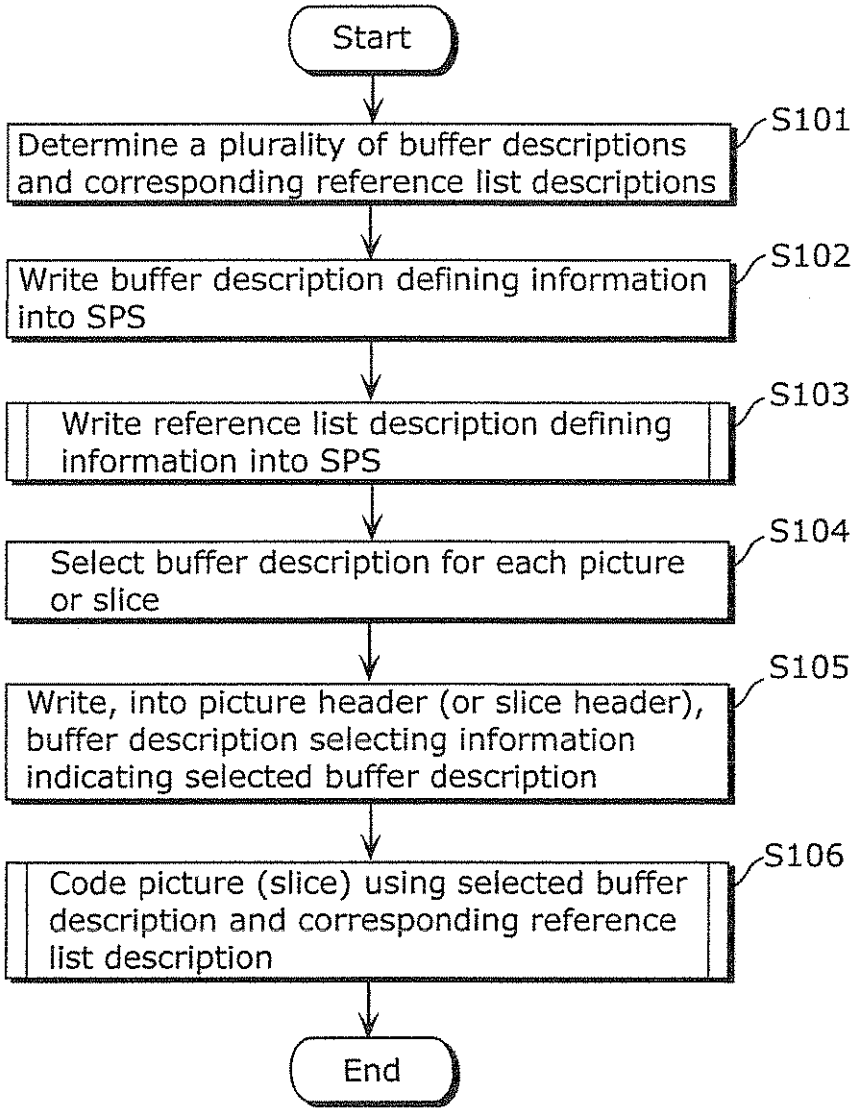

Start
Determine a plurality of buffer descriptions and corresponding reference list descriptions
S101
Write buffer description defining information into SPS
S102
Write reference list description defining information into SPS
S103
Select buffer description for each picture or slice
S104
Write, into picture header (or slice header), buffer description selecting information indicating selected buffer description
S105
Code picture (slice) using selected buffer description and corresponding reference list description
S106
End

FIG. 5

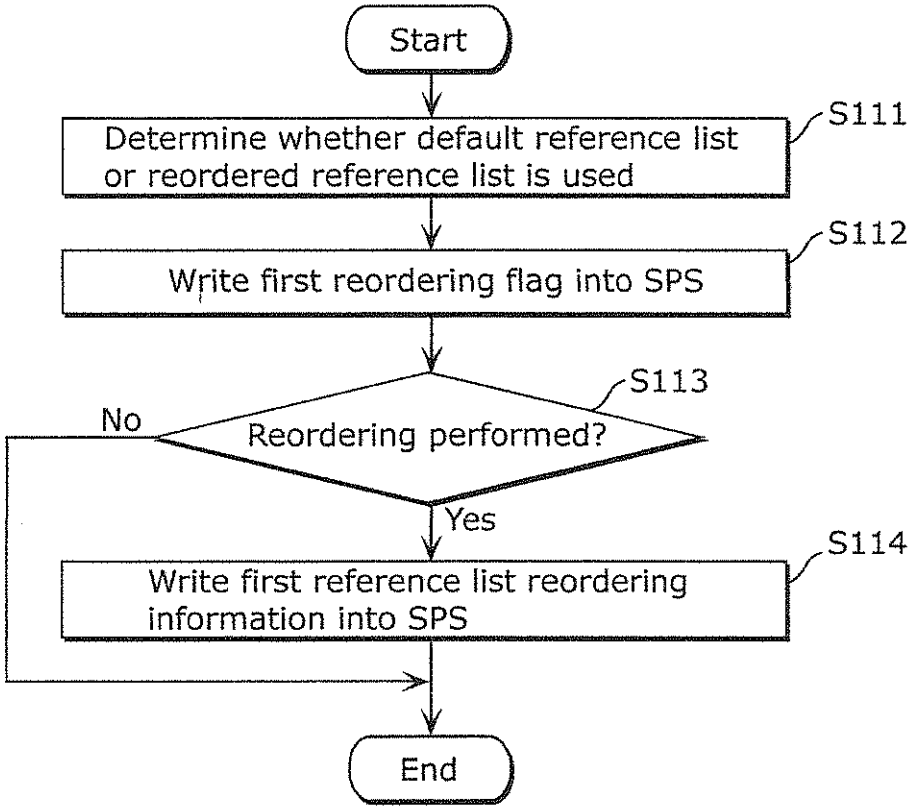

Start
Determine whether default reference list or reordered reference list is used
S111
Write first reordering flag into SPS
S112
Reordering performed?
S113
No
Yes
Write first reference list reordering information into SPS
S114
End

FIG. 6

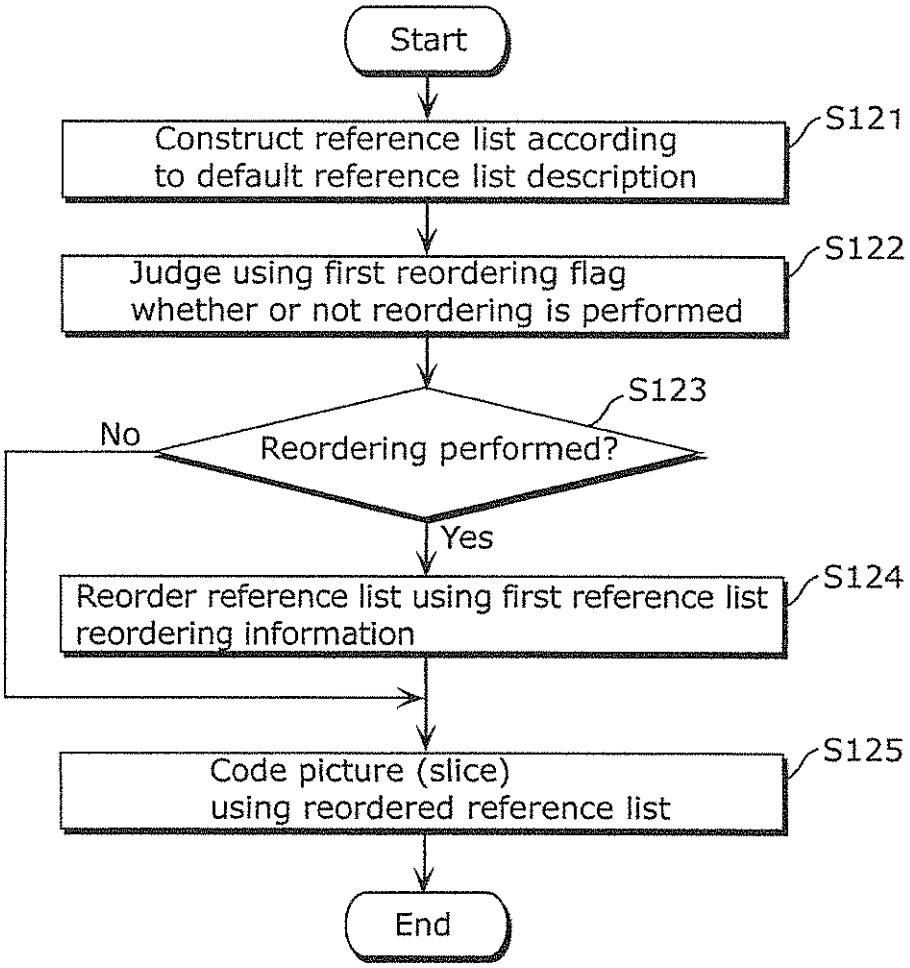

Start
Construct reference list according to default reference list description
S121
Judge using first reordering flag whether or not reordering is performed
S122
Reordering performed?
S123
No
Yes
Reorder reference list using first reference list reordering information
S124
Code picture (slice) using reordered reference list
S125
End

FIG. 7

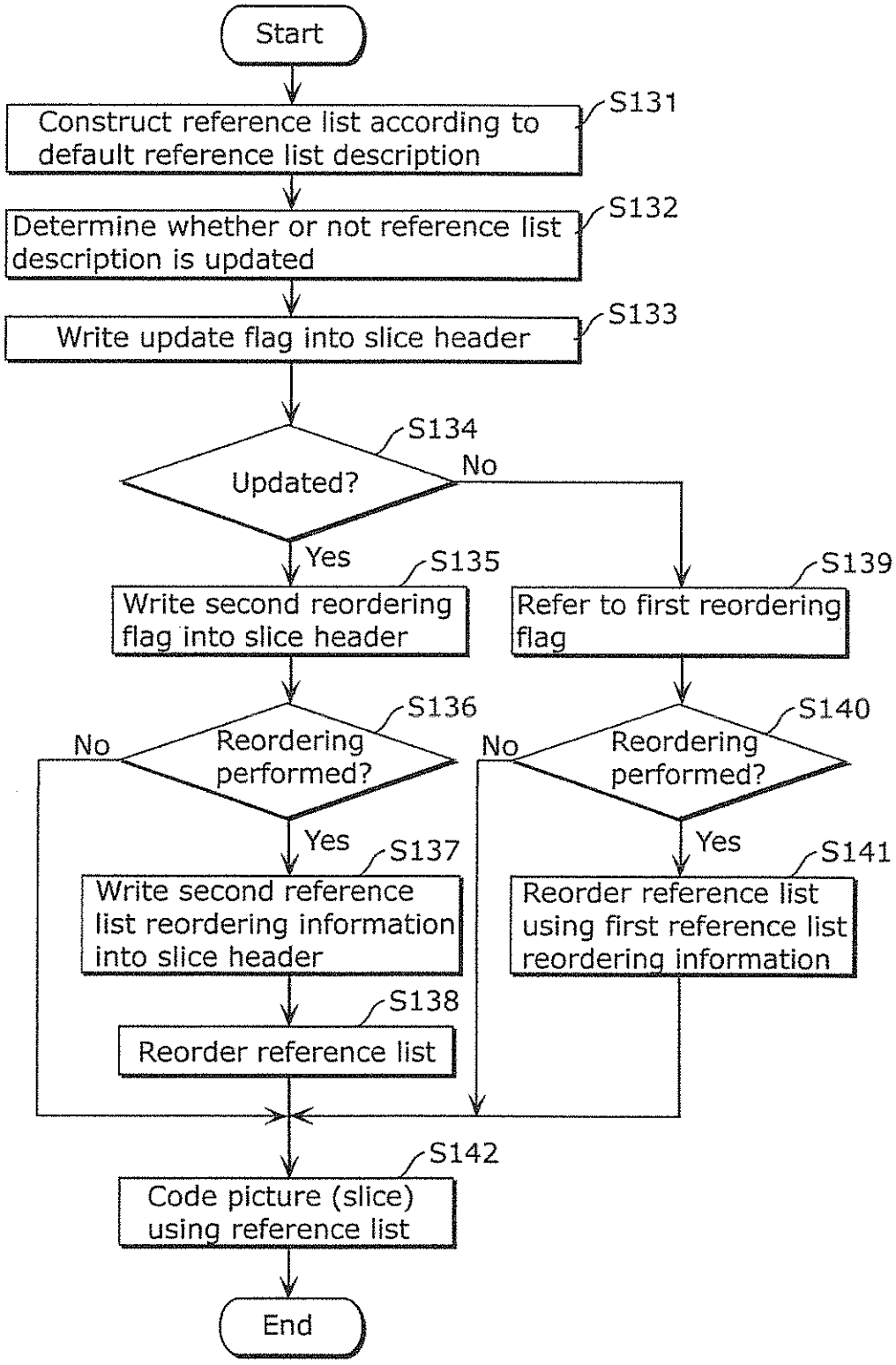

Start
Construct reference list according to default reference list description
S131
Determine whether or not reference list description is updated
S132
Write update flag into slice header
S133
Updated?
S134
No
Yes
Write second reordering flag into slice header
S135
Refer to first reordering flag
S139
Reordering performed?
S136
No
Yes
Write second reference list reordering information into slice header
S137
Reorder reference list
S138
Reordering performed?
S140
No
Yes
Reorder reference list using first reference list reordering information
S141
Code picture (slice) using reference list
S142
End

FIG. 8A

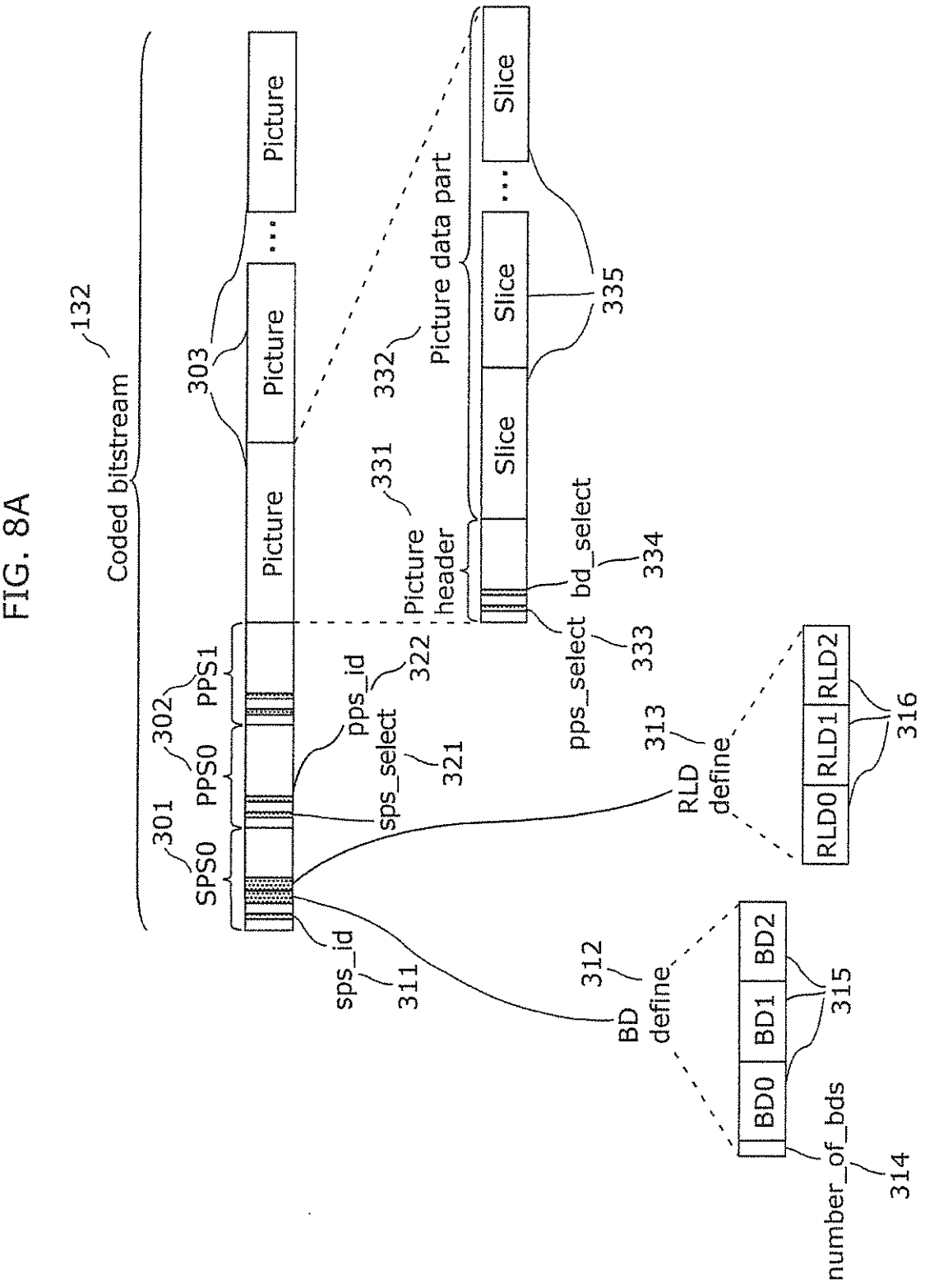

132
Coded bitstream
301
SPS0
302
PPS0
PPS1
303
Picture
Picture
Picture
Picture
311
sps_id
312
BD
define
BD0
BD1
BD2
number_of_bds
314
315
sps_select
321
pps_id
322
313
RLD
define
RLD0
RLD1
RLD2
316
331
Picture
header
332
Picture data part
Slice
Slice
Slice
Slice
335
pps_select
333
bd_select
334

FIG. 8B

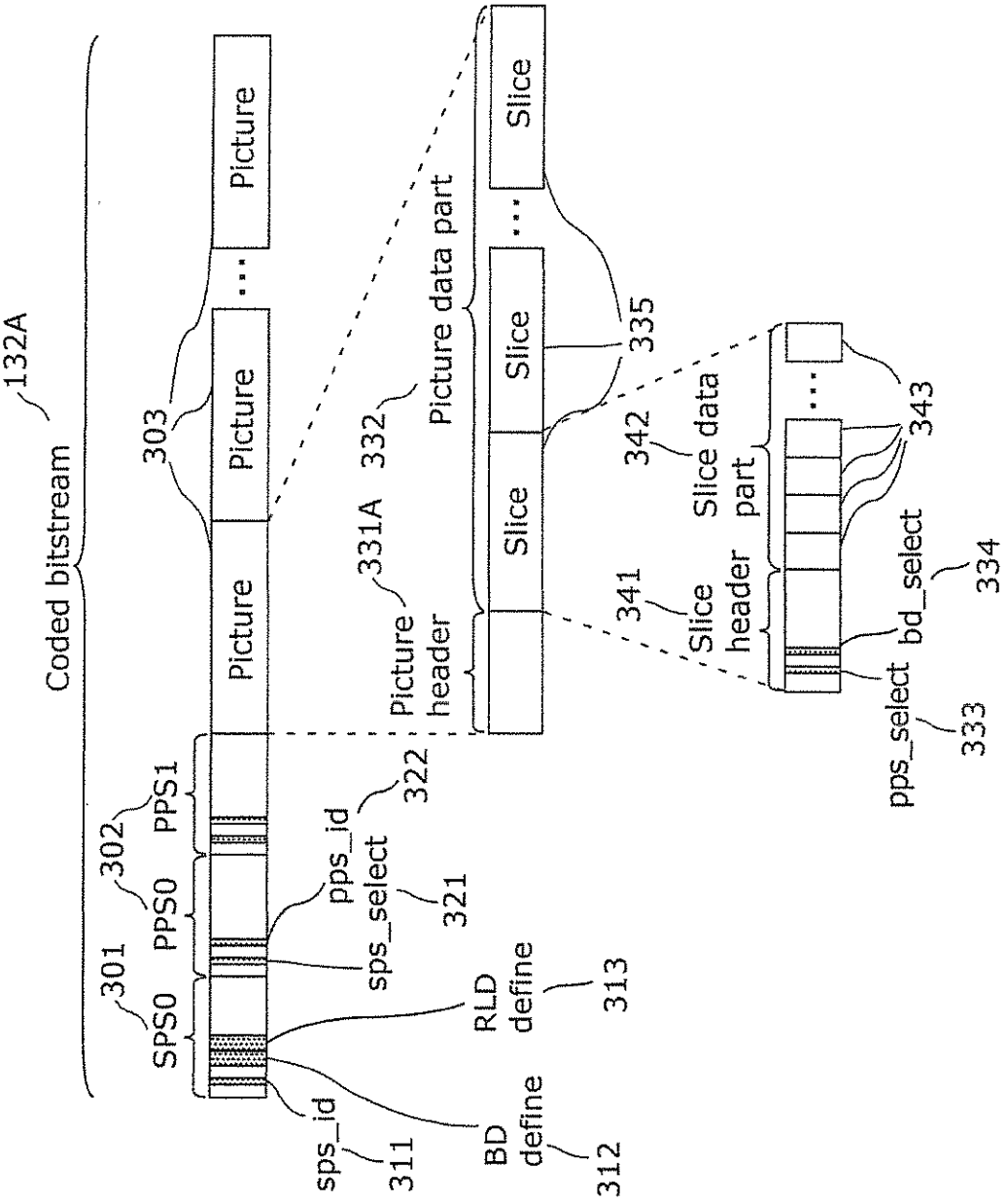

132A
Coded bitstream
301
SPS0
302
PPS0
PPS1
303
Picture
Picture
Picture
Picture
sps_id
311
BD define
312
RLD define
313
pps_id
322
sps_select
321
Picture header
331A
332
Picture data part
Slice
Slice
Slice
335
341
Slice header
342
Slice data part
343
pps_select
333
bd_select
334

FIG. 9

sequence_parameter_set() {	Descriptor
/* other syntax elements */	
...	
/* syntax elements for buffer description defining parameters */	u (2)
bits_for_temporal_id	
number_of_bds	ue (v)
if (number_of_bds > 0) {	
for (i = 0; i < number_of_bds; i++) {	
number_of_bes_minus1[i]	ue (v)
first_delta_poc_sign_flag[i]	u (1)
first_delta_poc_minus1[i]	ue (v)
first_temporal_id[i]	u (v)
for (j = 0; j < number_of_bes_minus1[i]; j++) {	
delta_poc_minus1[i][j]	ue (v)
temporal_id[i][j]	ue (v)
}	
}	
}	
/* syntax elements for reference list description defining parameters */	
if (number_of_bds > 0) {	
for (i = 0; i < number_of_bds; i++) {	
ref_pic_list_modification_flag_l0[i]	u (1)
if (ref_pic_list_modification_flag_l0[i]) {	
num_ref_idx_l0_active_minus1[i]	ue (v)
do {	
more_modification_flag	u (1)
if (more_modification_flag == 1) {	
be_idx_in_ref_pic_list	ue (v)
}	
} while (more_modification_flag == 1)	
}	
ref_pic_list_modification_flag_l1[i]	u (1)
if(ref_pic_list_modification_flag_l1[i]) {	
num_ref_idx_l1_active_minus1[i]	ue (v)
do {	
more_modification_flag	u (1)
if (more_modification_flag == 1) {	
be_idx_in_ref_pic_list	ue (v)
}	
} while (more_modification_flag == 1)	
}	
}	
}	
/* other syntax elements */	
...	
}	

FIG. 10

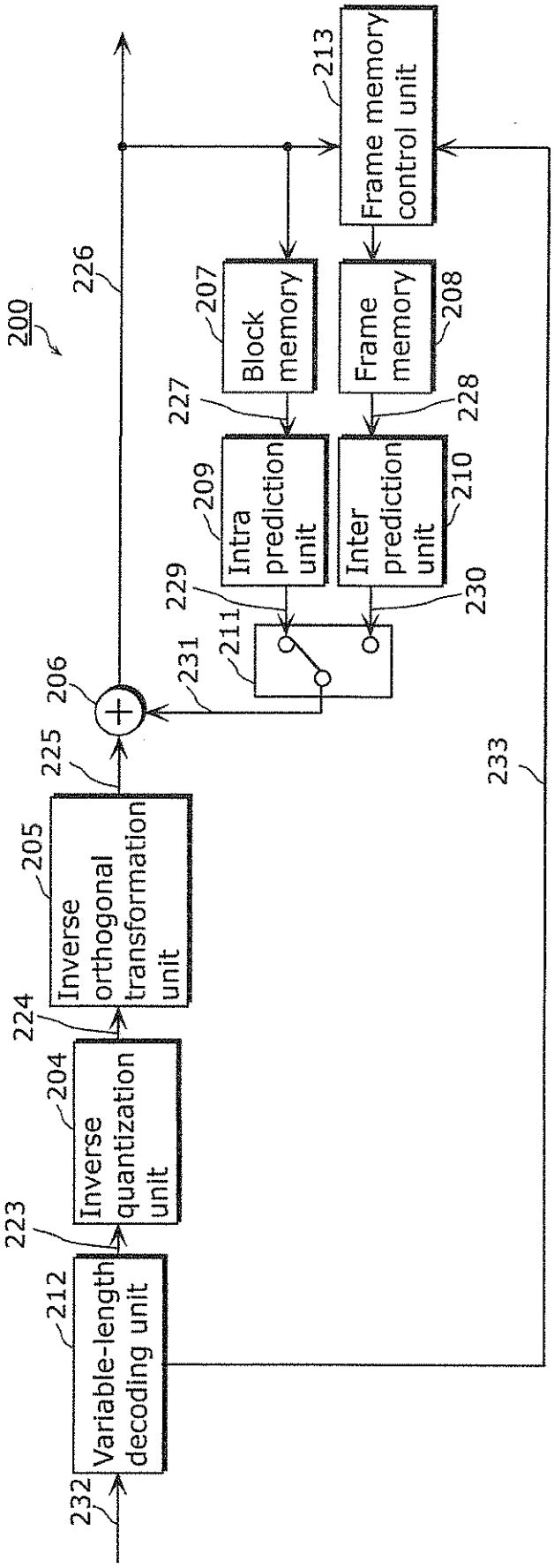

200
Variable-length decoding unit
212
232
Inverse quantization unit
204
223
Inverse orthogonal transformation unit
205
224
225
206
231
211
229
230
Intra prediction unit
209
Inter prediction unit
210
227
228
Block memory
207
Frame memory
208
Frame memory control unit
213
226
233

FIG. 11

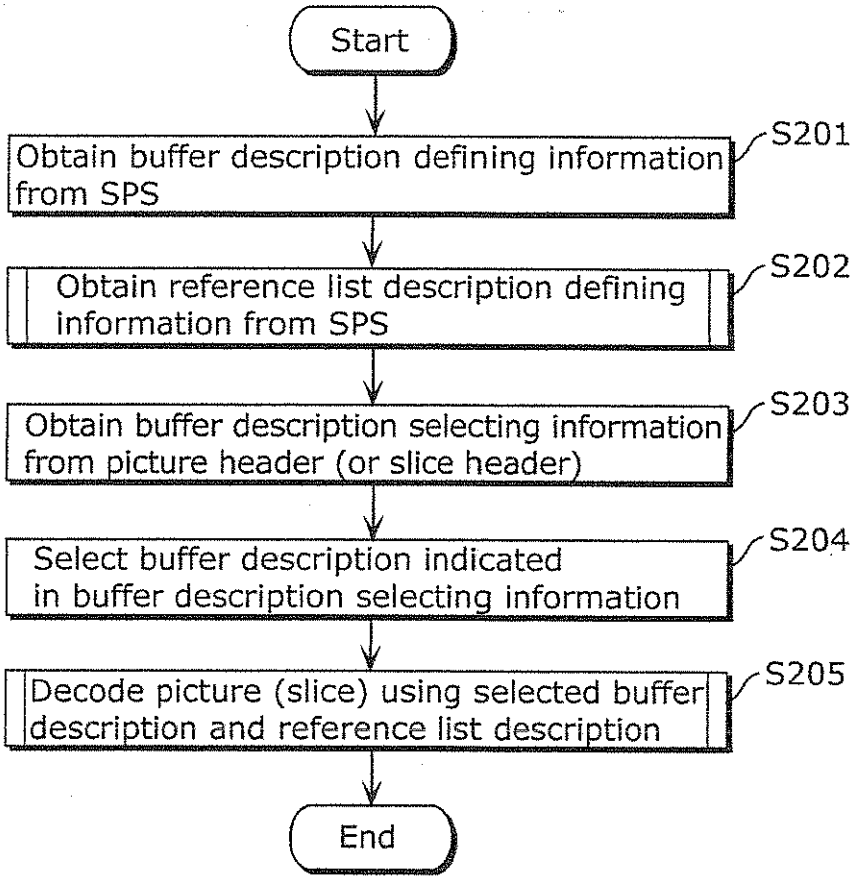

Start
Obtain buffer description defining information from SPS
S201
Obtain reference list description defining information from SPS
S202
Obtain buffer description selecting information from picture header (or slice header)
S203
Select buffer description indicated in buffer description selecting information
S204
Decode picture (slice) using selected buffer description and reference list description
S205
End

FIG. 12

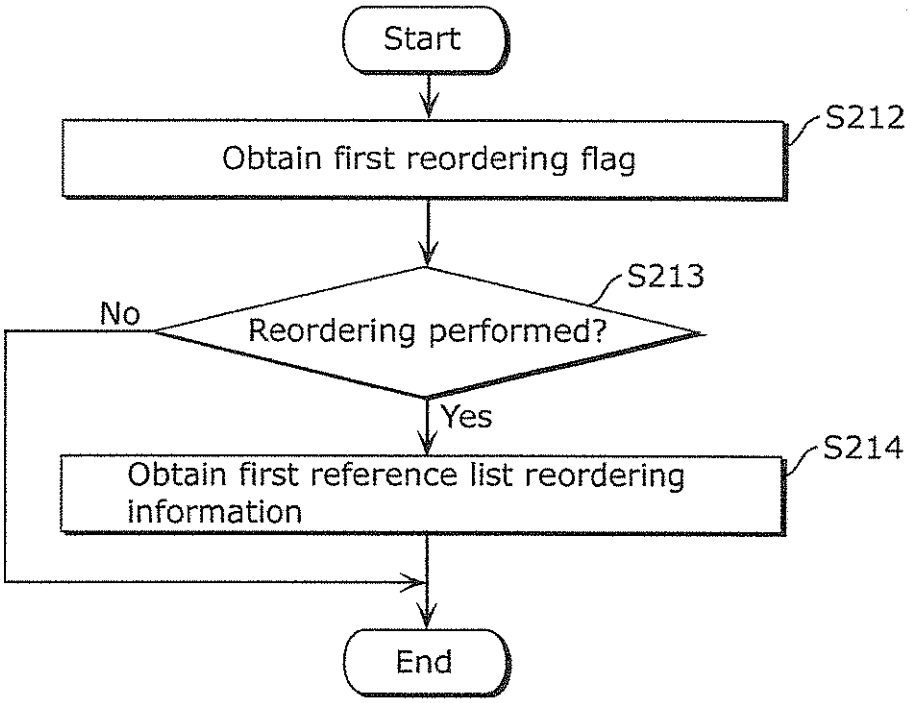

Start
Obtain first reordering flag
S212
S213
No
Reordering performed?
Yes
Obtain first reference list reordering information
S214
End

FIG. 13

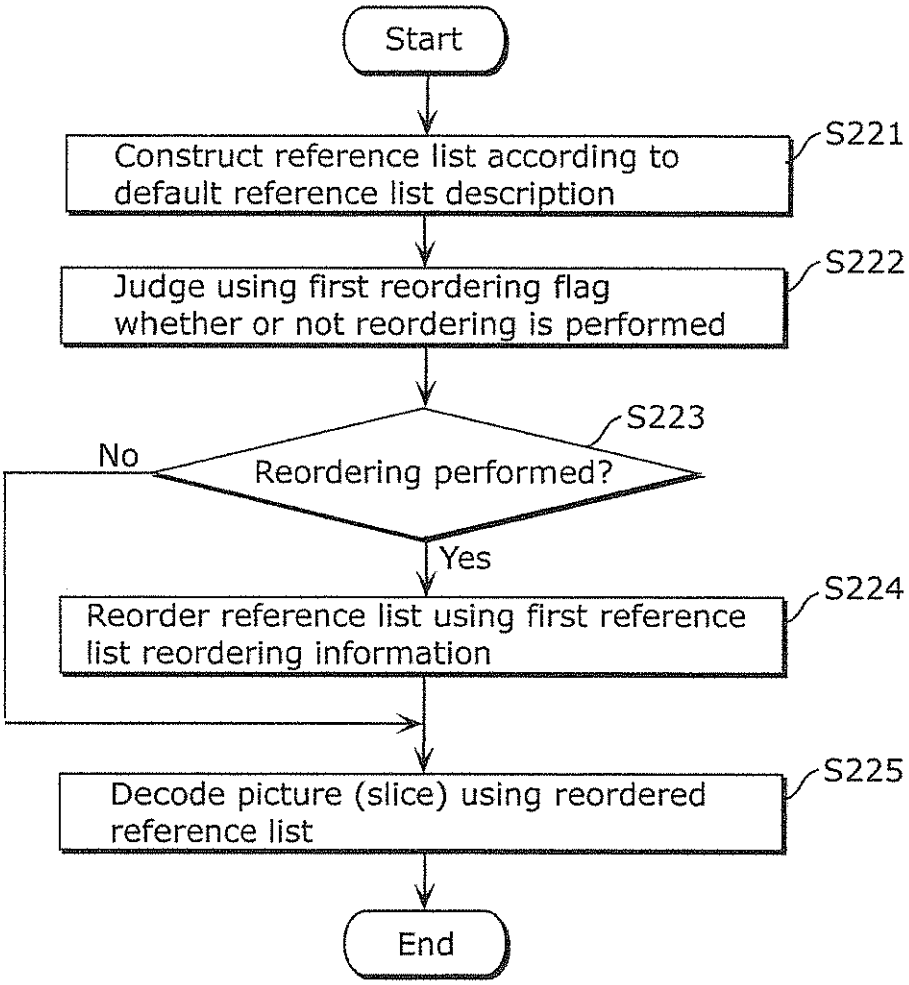

Start
Construct reference list according to default reference list description
S221
Judge using first reordering flag whether or not reordering is performed
S222
Reordering performed?
S223
No
Yes
Reorder reference list using first reference list reordering information
S224
Decode picture (slice) using reordered reference list
S225
End

FIG. 14

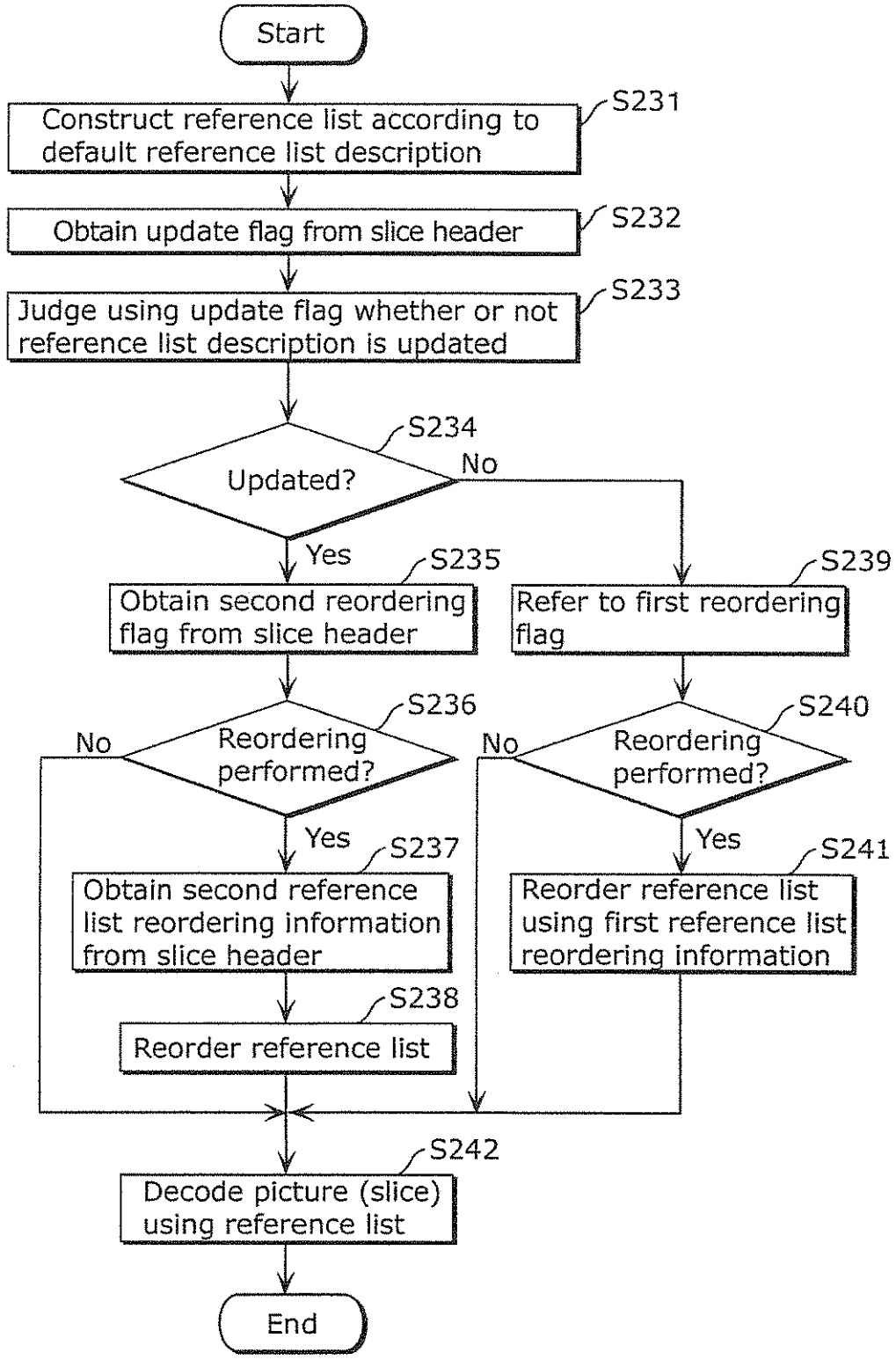

Start
Construct reference list according to default reference list description
S231
Obtain update flag from slice header
S232
Judge using update flag whether or not reference list description is updated
S233
Updated?
S234
No
Yes
Obtain second reordering flag from slice header
S235
Refer to first reordering flag
S239
Reordering performed?
S236
No
Yes
Obtain second reference list reordering information from slice header
S237
Reorder reference list
S238
Reordering performed?
S240
No
Yes
Reorder reference list using first reference list reordering information
S241
Decode picture (slice) using reference list
S242
End

FIG. 15

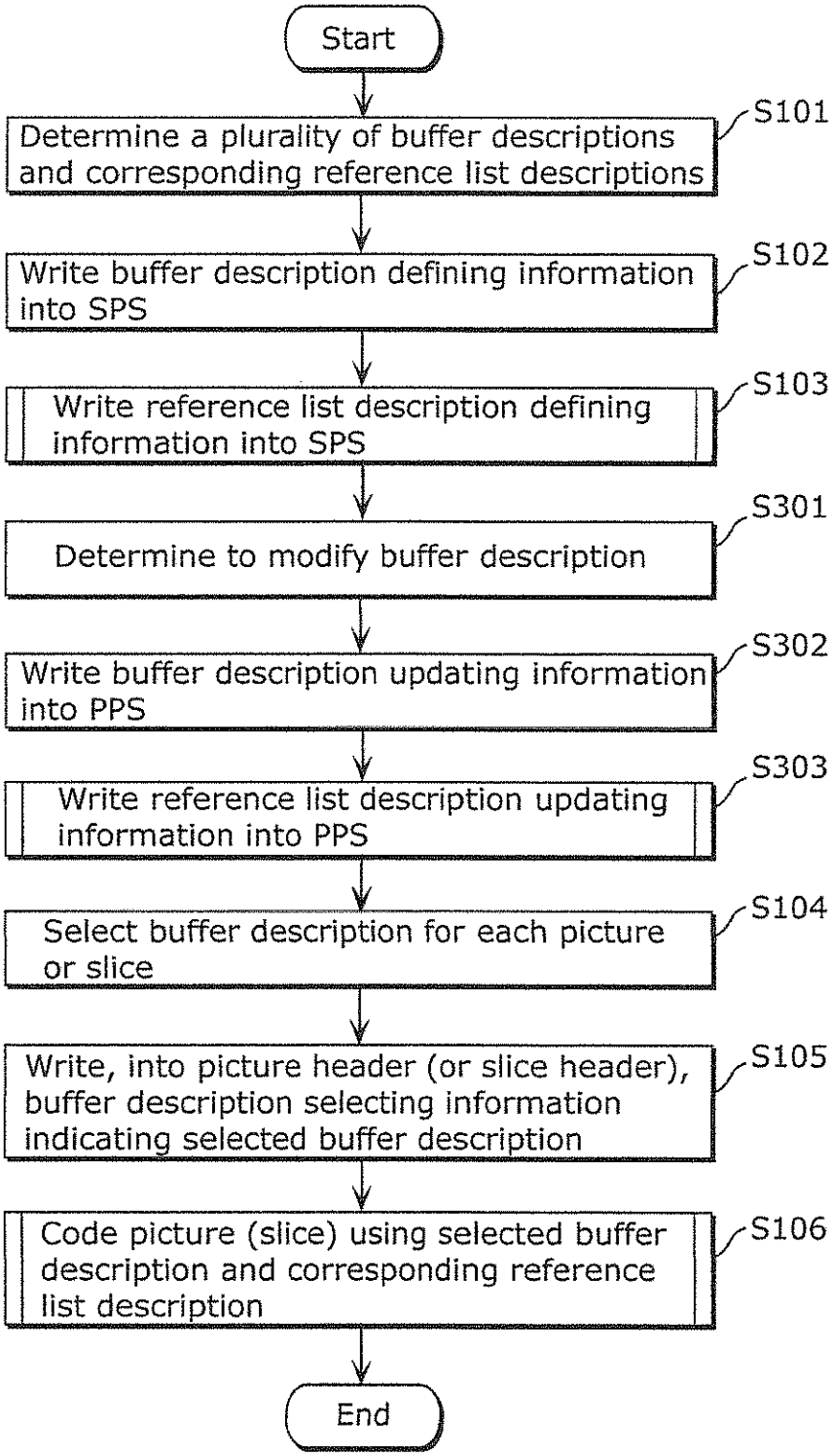

Start
Determine a plurality of buffer descriptions and corresponding reference list descriptions
S101
Write buffer description defining information into SPS
S102
Write reference list description defining information into SPS
S103
Determine to modify buffer description
S301
Write buffer description updating information into PPS
S302
Write reference list description updating information into PPS
S303
Select buffer description for each picture or slice
S104
Write, into picture header (or slice header), buffer description selecting information indicating selected buffer description
S105
Code picture (slice) using selected buffer description and corresponding reference list description
S106
End

FIG. 16

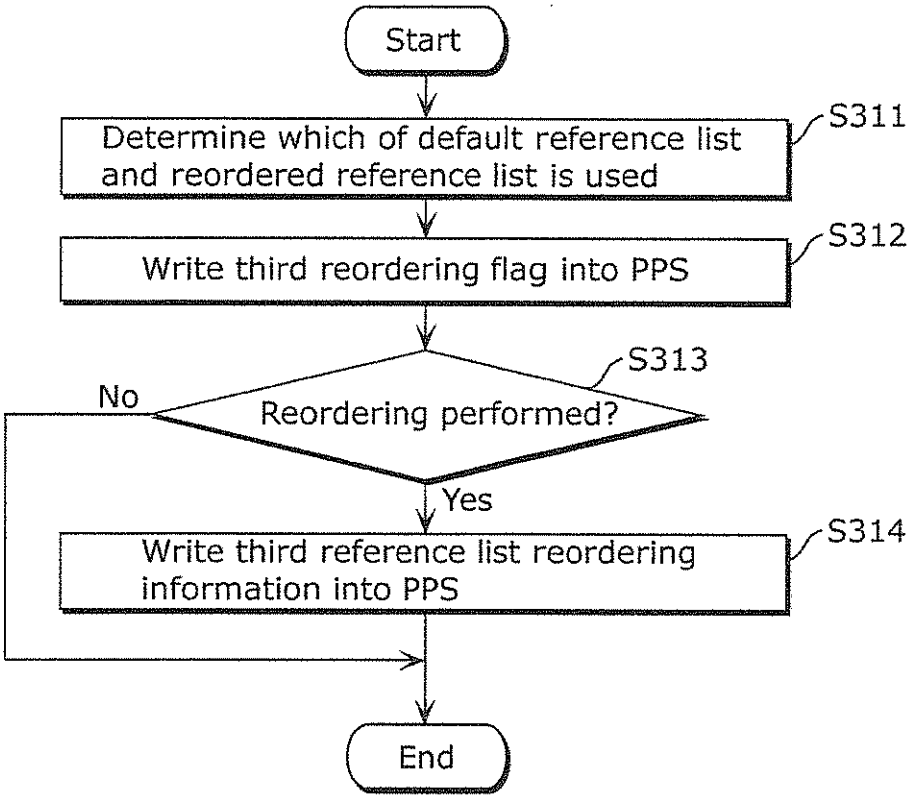

Start
Determine which of default reference list and reordered reference list is used
S311
Write third reordering flag into PPS
S312
Reordering performed?
S313
No
Yes
Write third reference list reordering information into PPS
S314
End

FIG. 17A

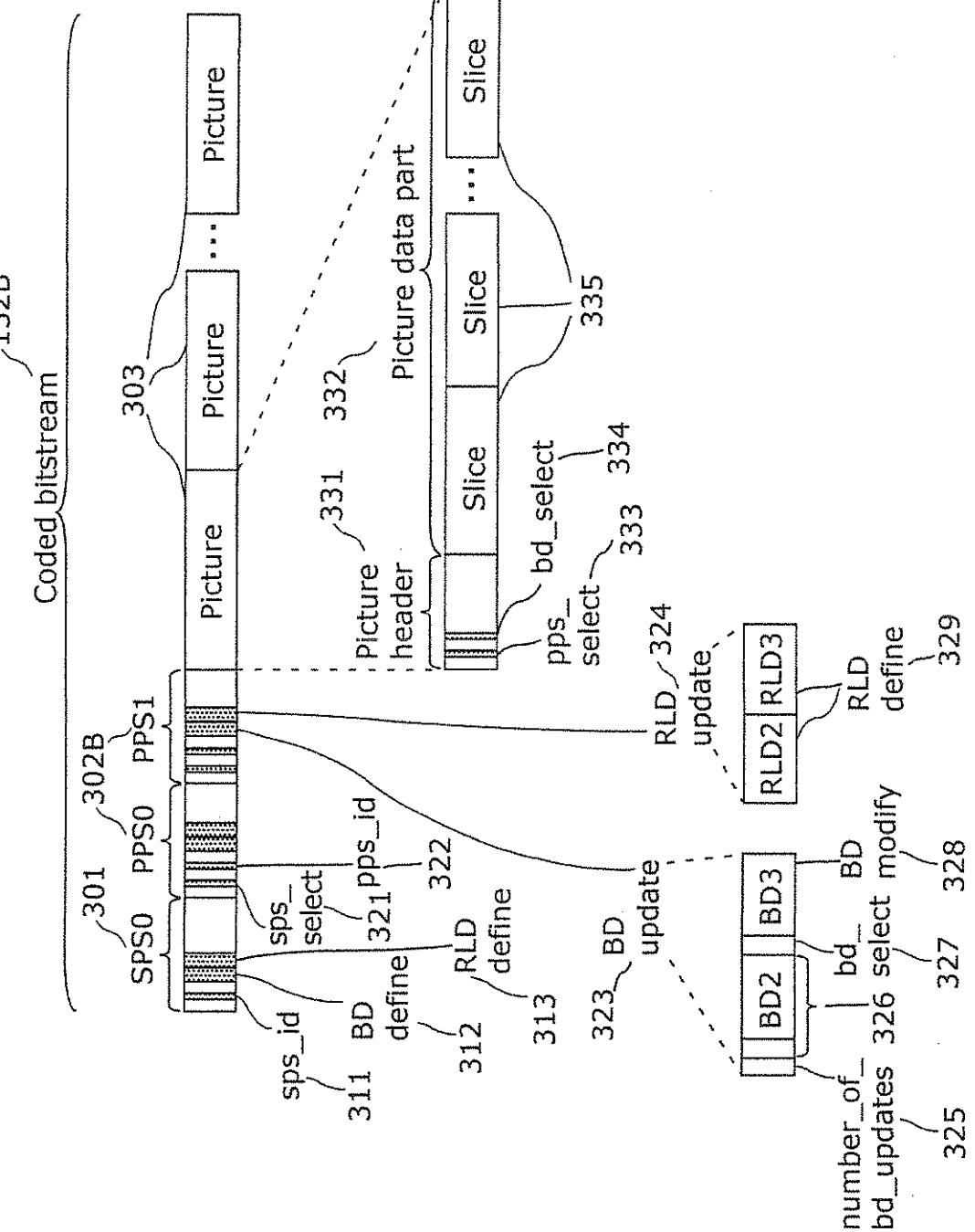

132B
Coded bitstream
301
SPS0
302B
PPS0
PPS1
303
Picture
Picture
Picture
Picture
311
sps_id
312
BD define
313
RLD define
321
sps_ select
322
pps_id
323
BD update
324
RLD update
325
number_of_ bd_updates
326
BD2
BD3
327
bd_ select
328
BD modify
329
RLD2
RLD3
RLD define
331
Picture header
332
Picture data part
333
pps_ select
334
bd_select
335
Slice
Slice
Slice
Slice

FIG. 17B

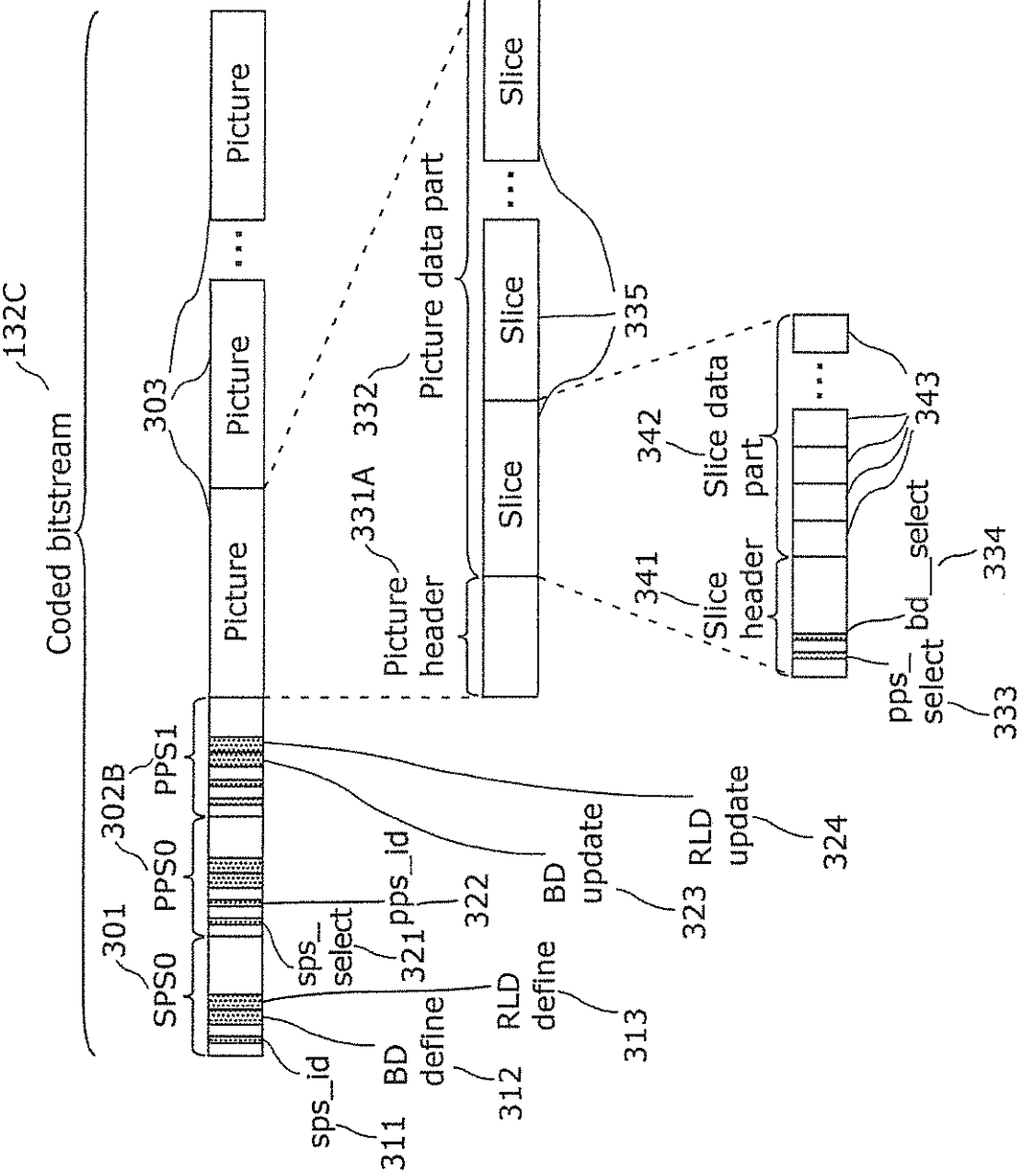

132C
Coded bitstream
301
SPS0
302B
PPS0
PPS1
303
Picture
Picture
Picture
Picture
311
sps_id
312
BD define
313
RLD define
321
sps_ select
322
pps_id
323
BD update
324
RLD update
331A
Picture header
332
Picture data part
335
Slice
Slice
Slice
341
Slice header
342
Slice data part
343
pps_ select
bd_ select
333
334

FIG. 18

picture_parameter_set() {	Descriptor
/* other syntax elements */	
...	
/* syntax elements for buffer description updating parameters */	
number_of_bd_updates	ue (v)
if (number_of_bd_updates > 0) {	
for (i = 0; i < number_of_bd_updates; i++) {	
bd_select	ae (v)
do {	
bd_modification_operation	ue (v)
if (bd_modification_operation == 1) {	
be_idx_in_bd_update	ue (v)
delta_poc_sign_flag	u (1)
delta_poc_minus1	ue (v)
temporal_id	u (v)
}	
} while (bd_modification_operation == 1)	
}	
}	
/* syntax elements for reference list description updating parameters */	
if (number_of_bd_updates > 0) {	
for (i = 0; i < number_of_bd_updates; i++) {	
ref_pic_list_modification_flag_l0[i]	u (1)
if (ref_pic_list_modification_flag_l0[i]) {	
num_ref_idx_l0_active_minus1[i]	ue (v)
do {	
more_modification_flag	u (1)
if (more_modification_flag == 1) {	
be_idx_in_ref_pic_list	ue (v)
}	
} while (more_modification_flag == 1)	
}	
ref_pic_list_modification_flag_l1[i]	u (1)
if(ref_pic_list_modification_flag_l1[i]) {	
num_ref_idx_l1_active_minus1[i]	ue (v)
do {	
more_modification_flag	u (1)
if (more_modification_flag == 1) {	
be_idx_in_ref_pic_list	ue (v)
}	
} while (more_modification_flag == 1)	
}	
}	
}	
/* other syntax elements */	
...	
}	

FIG. 19

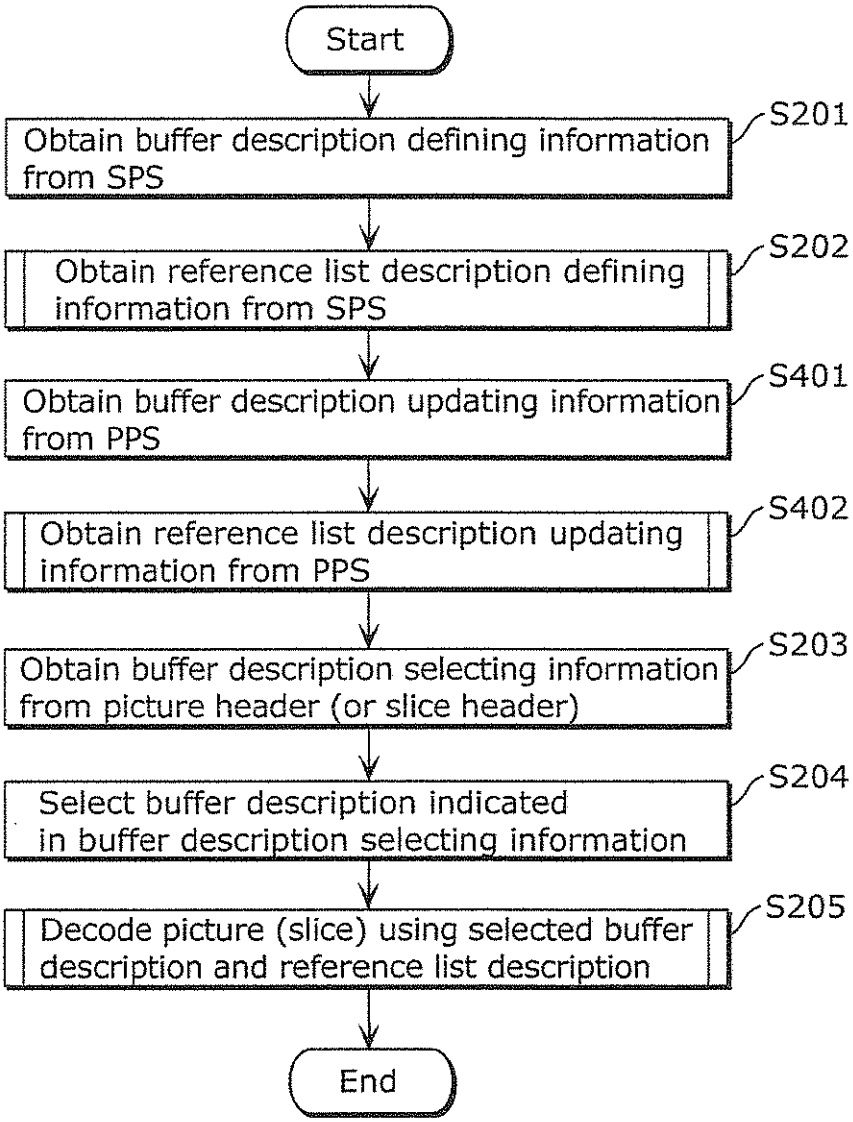

Start
Obtain buffer description defining information from SPS
S201
Obtain reference list description defining information from SPS
S202
Obtain buffer description updating information from PPS
S401
Obtain reference list description updating information from PPS
S402
Obtain buffer description selecting information from picture header (or slice header)
S203
Select buffer description indicated in buffer description selecting information
S204
Decode picture (slice) using selected buffer description and reference list description
S205
End

FIG. 20

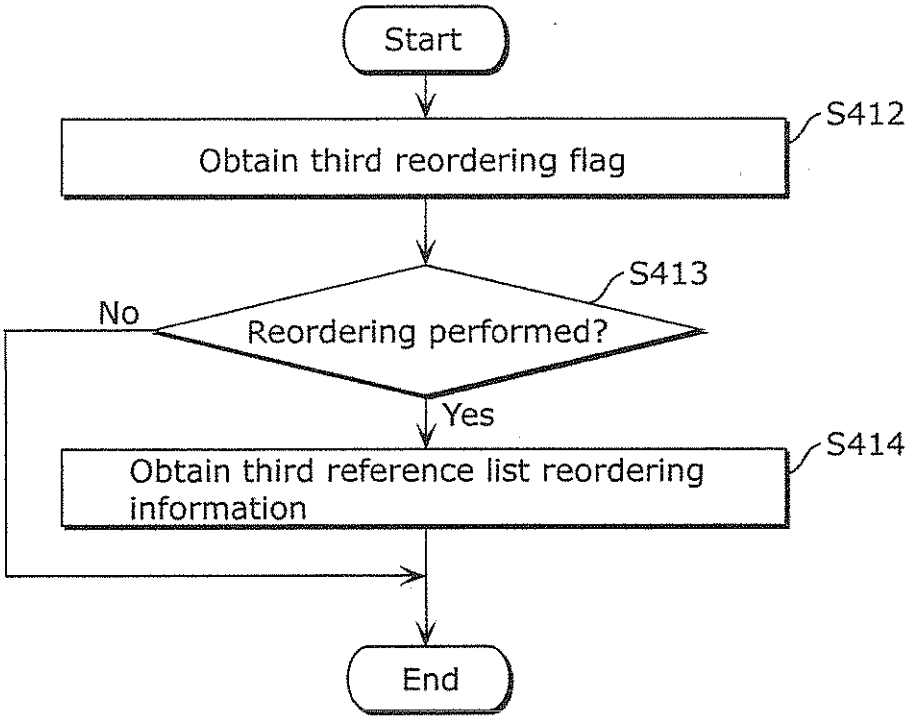

Start
Obtain third reordering flag
S412
S413
Reordering performed?
No
Yes
Obtain third reference list reordering information
S414
End

FIG. 21

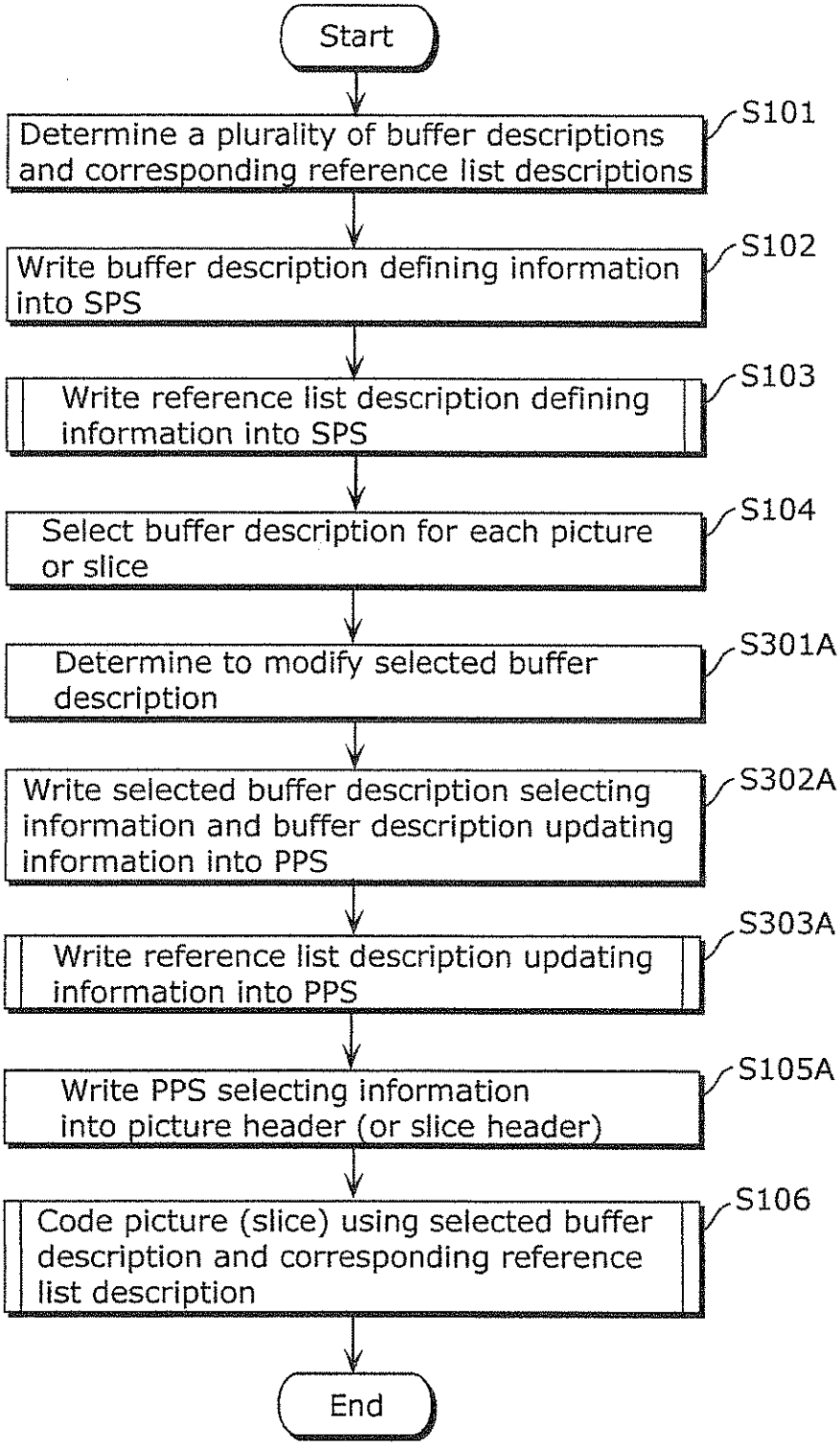

Start
Determine a plurality of buffer descriptions and corresponding reference list descriptions
S101
Write buffer description defining information into SPS
S102
Write reference list description defining information into SPS
S103
Select buffer description for each picture or slice
S104
Determine to modify selected buffer description
S301A
Write selected buffer description selecting information and buffer description updating information into PPS
S302A
Write reference list description updating information into PPS
S303A
Write PPS selecting information into picture header (or slice header)
S105A
Code picture (slice) using selected buffer description and corresponding reference list description
S106
End

FIG. 22A

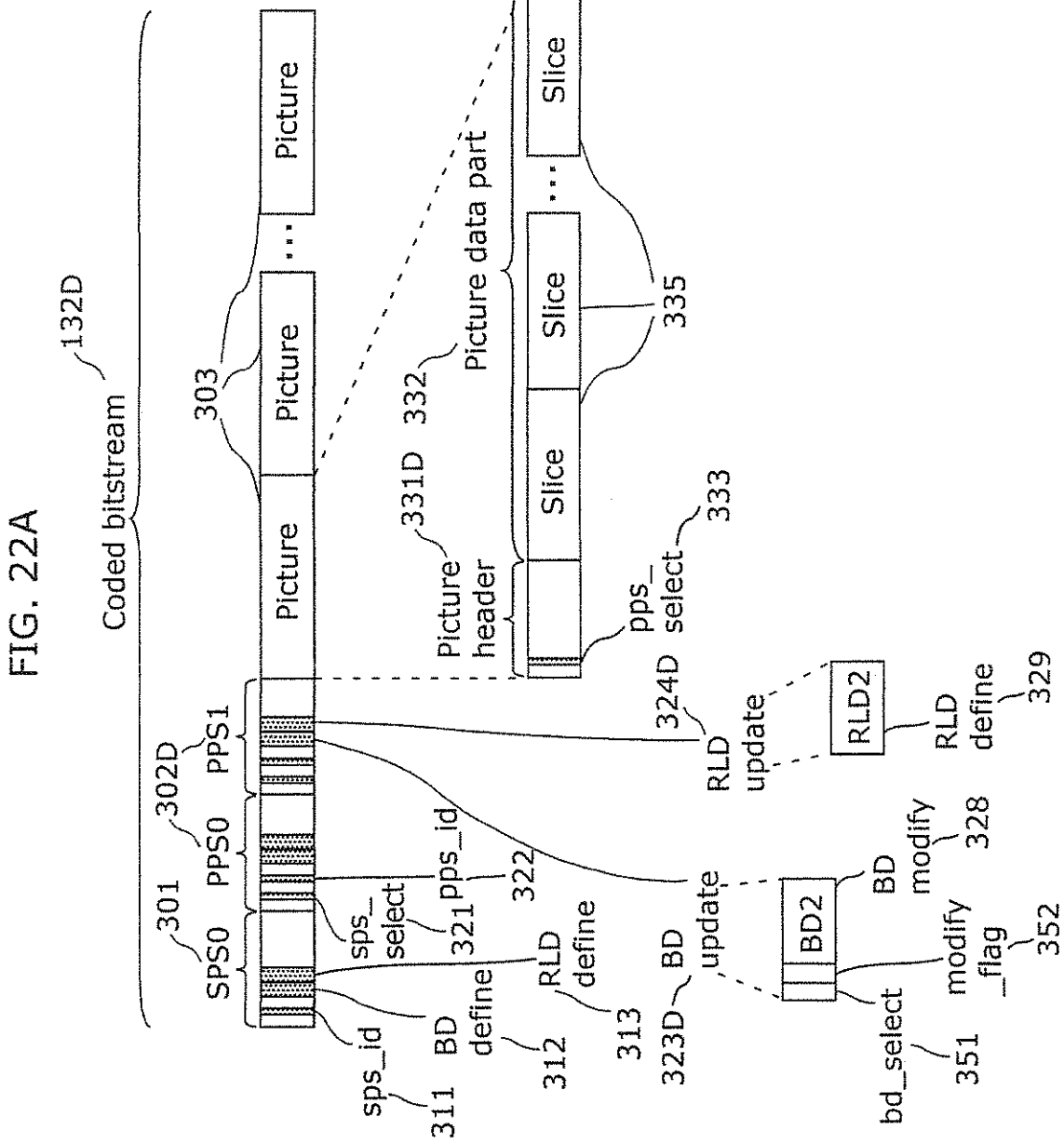

132D
Coded bitstream
301
SPS0
302D
PPS0
PPS1
303
Picture
Picture
Picture
...
Picture
Picture data part
331D
Picture header
332
Slice
Slice
...
Slice
335
sps_id
311
BD define
312
RLD define
313
sps_ select
321
pps_id
322
pps_ select
333
324D
RLD update
RLD2
RLD define
329
BD update
323D
BD2
BD modify
328
bd_select
351
modify _flag
352

FIG. 22B

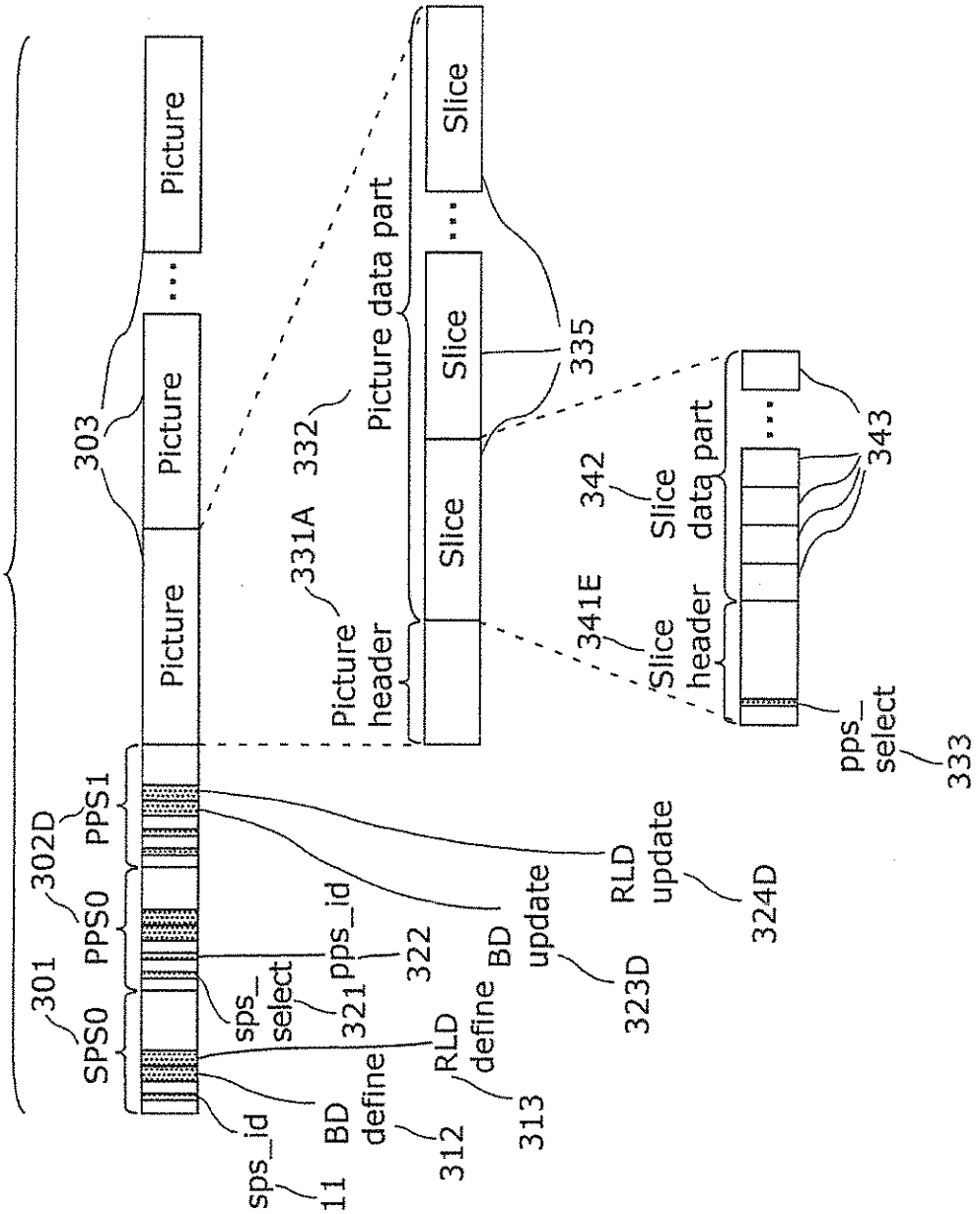

132E
Coded bitstream
301
SPS0
PPS0
302D
PPS1
303
Picture
Picture
Picture
Picture
sps_id
311
BD define
312
RLD define
313
sps_ select
321
pps_id
322
BD update
323D
RLD update
324D
331A
Picture header
332
Picture data part
Slice
Slice
Slice
335
341E
Slice header
342
Slice data part
343
pps_ select
333

FIG. 23

picture_parameter_set() {	Descriptor
/* other syntax elements */	
...	
/* syntax elements for buffer description updating parameters */	
bd_select	ue (v)
IsBDModified = 0	
do {	
bd_modification_operation	ue (v)
if (bd_modification_operation == 1) {	
IsBDModified = 1	
be_idx_in_bd_update	ue (v)
delta_poc_sign_flag	u (1)
delta_poc_minus1	ue (v)
temporal_id	u (v)
}	
} while (bd_modification_operation == 1)	
/* syntax elements for reference list description updating parameters */	
if (IsBDModified = 1) {	
ref_pic_list_modification_flag_l0[i]	u (1)
if (ref_pic_list_modification_flag_l0[i]) {	
num_ref_idx_l0_active_minus1[i]	ue (v)
do {	
more_modification_flag	u (1)
if (more_modification_flag == 1) {	
be_idx_in_ref_pic_list	ue (v)
}	
} while (more_modification_flag == 1)	
}	
ref_pic_list_modification_flag_l1[i]	u (1)
if(ref_pic_list_modification_flag_l1[i]) {	
num_ref_idx_l1_active_minus1[i]	ue (v)
do {	
more_modification_flag	u (1)
if (more_modification_flag == 1) {	
be_idx_in_ref_pic_list	ue (v)
}	
} while (more_modification_flag == 1)	
}	
}	
/* other syntax elements */	
...	
}	

FIG. 24

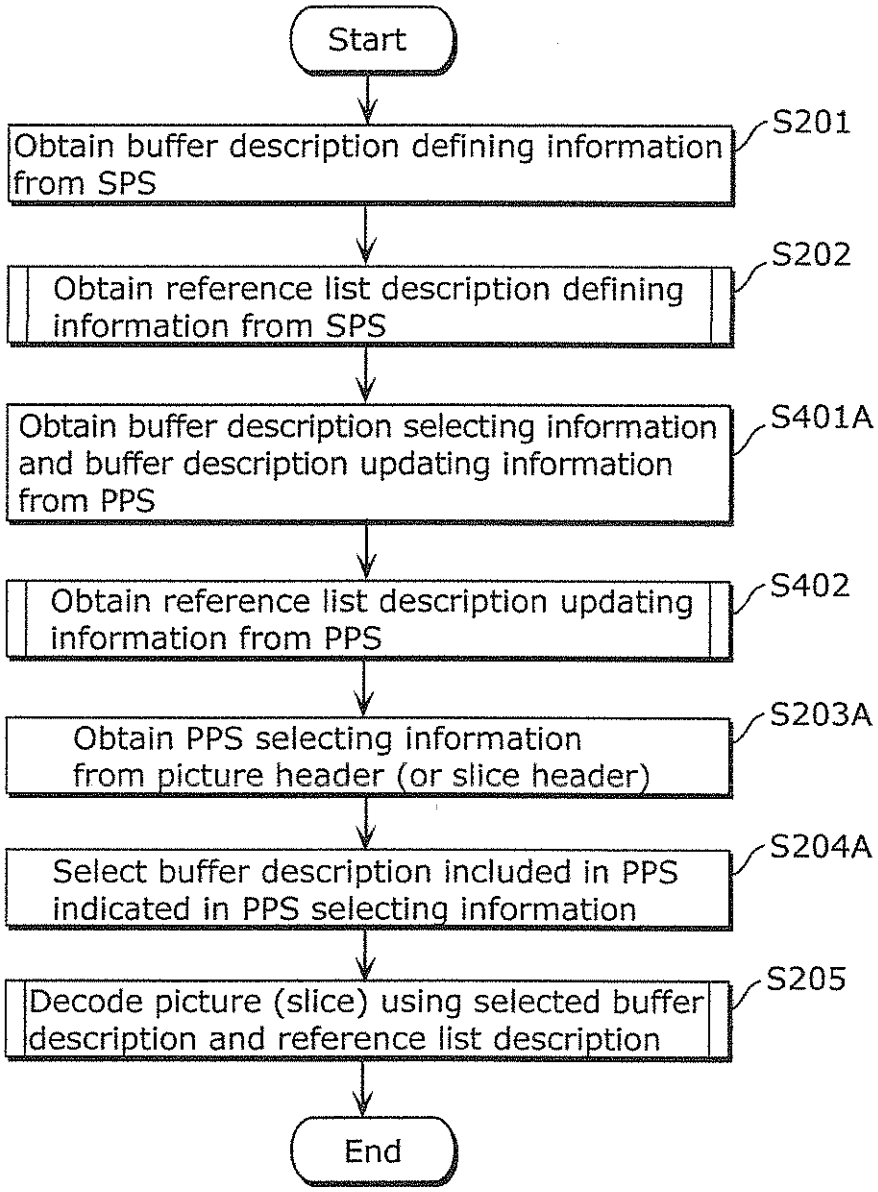

Start
Obtain buffer description defining information from SPS
S201
Obtain reference list description defining information from SPS
S202
Obtain buffer description selecting information and buffer description updating information from PPS
S401A
Obtain reference list description updating information from PPS
S402
Obtain PPS selecting information from picture header (or slice header)
S203A
Select buffer description included in PPS indicated in PPS selecting information
S204A
Decode picture (slice) using selected buffer description and reference list description
S205
End

FIG. 25

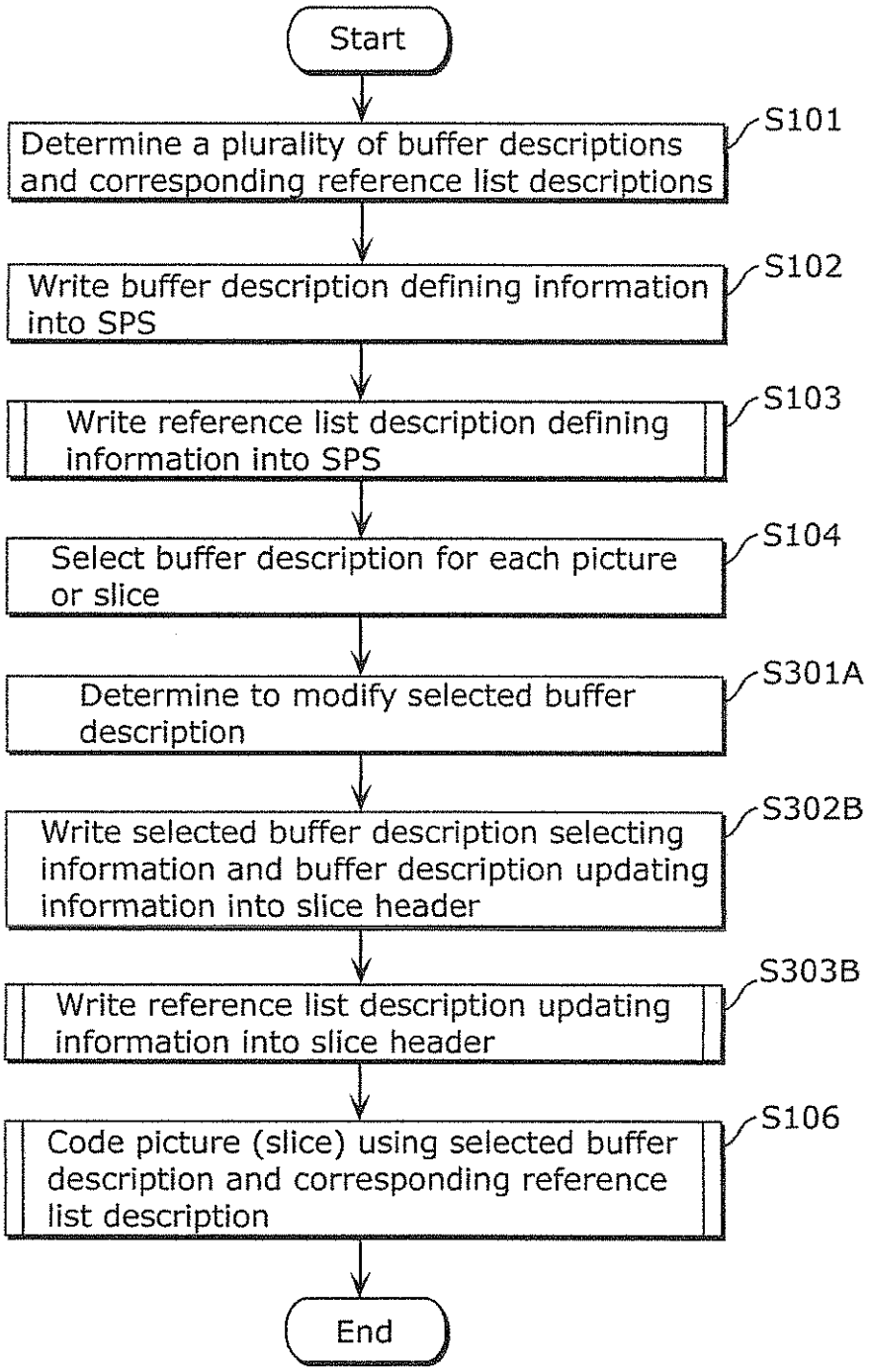

Start
Determine a plurality of buffer descriptions and corresponding reference list descriptions
S101
Write buffer description defining information into SPS
S102
Write reference list description defining information into SPS
S103
Select buffer description for each picture or slice
S104
Determine to modify selected buffer description
S301A
Write selected buffer description selecting information and buffer description updating information into slice header
S302B
Write reference list description updating information into slice header
S303B
Code picture (slice) using selected buffer description and corresponding reference list description
S106
End

FIG. 26

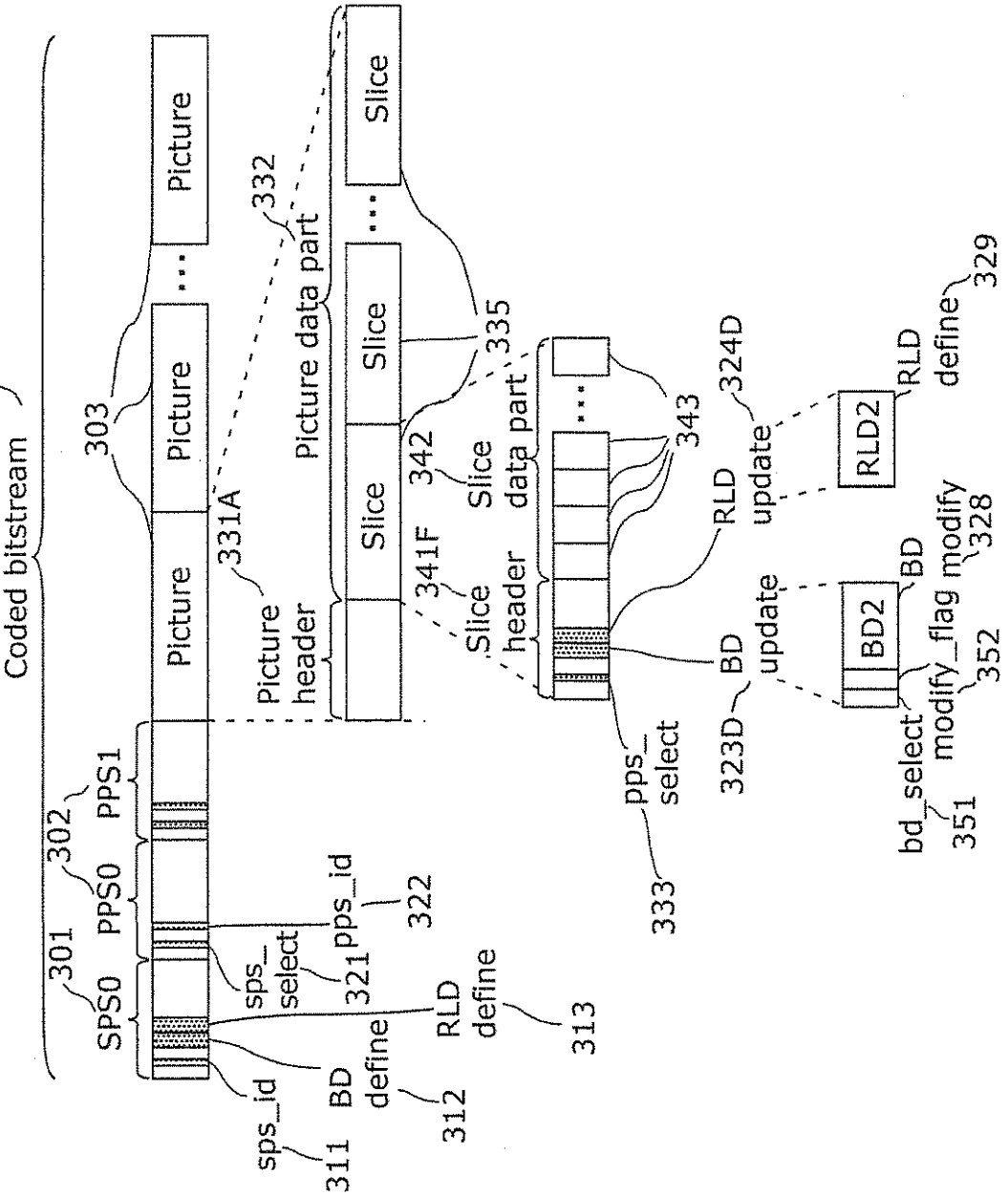

Coded bitstream
132F
301
SPS0
302
PPS0
PPS1
303
Picture
Picture
Picture
Picture
331A
Picture header
332
Picture data part
Slice
Slice
Slice
Slice
341F
Slice header
342
Slice data part
335
343
sps_id
311
BD define
312
RLD define
313
sps_ select
321
pps_id
322
pps_ select
333
BD update
323D
RLD update
324D
BD2
RLD2
BD
RLD
bd_select
351
modify_flag
352
modify
328
define
329

FIG. 27

slice_header () {	Descriptor
/* other syntax elements */	
...	
/* syntax elements for buffer description updating parameters */	
bd_select	ue (v)
IsBDModified = 0	
do {	
bd_modification_operation	ue (v)
if (bd_modification_operation == 1) {	
IsBDModified = 1	
be_idx_in_bd_update	ue (v)
delta_poc_sign_flag	u (1)
delta_poc_minus1	ue (v)
temporal_id	u (v)
}	
} while (bd_modification_operation == 1)	
/* syntax elements for reference list description updating parameters */	
if (IsBDModified = 1) {	
ref_pic_list_modification_flag_l0[i]	u (1)
if (ref_pic_list_modification_flag_l0[i]) {	
num_ref_idx_l0_active_minus1[i]	ue (v)
do {	
more_modification_flag	u (1)
if (more_modification_flag == 1) {	
be_idx_in_ref_pic_list	ue (v)
}	
} while (more_modification_flag == 1)	
}	
ref_pic_list_modification_flag_l1[i]	u (1)
if(ref_pic_list_modification_flag_l1[i]) {	
num_ref_idx_l1_active_minus1[i]	ue (v)
do {	
more_modification_flag	u (1)
if (more_modification_flag == 1) {	
be_idx_in_ref_pic_list	ue (v)
}	
} while (more_modification_flag == 1)	
}	
}	
/* other syntax elements */	
...	
}	

FIG. 28

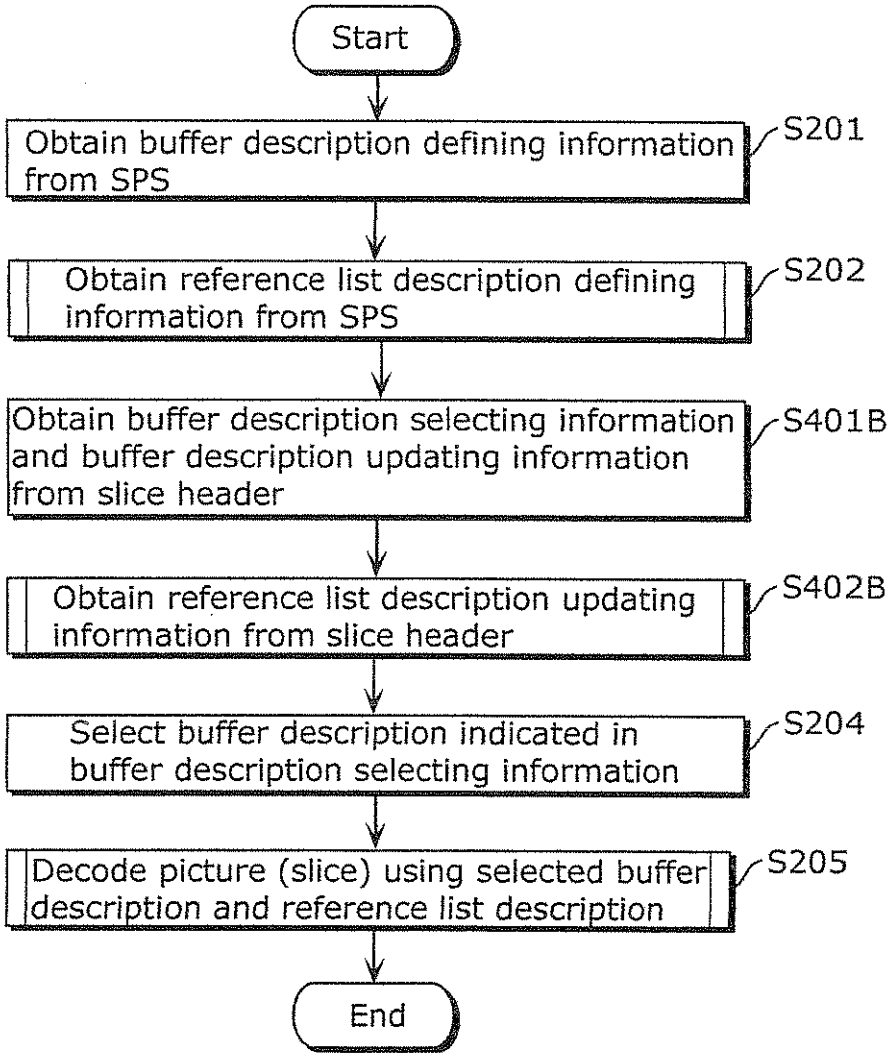

Start
Obtain buffer description defining information from SPS
S201
Obtain reference list description defining information from SPS
S202
Obtain buffer description selecting information and buffer description updating information from slice header
S401B
Obtain reference list description updating information from slice header
S402B
Select buffer description indicated in buffer description selecting information
S204
Decode picture (slice) using selected buffer description and reference list description
S205
End

FIG. 29

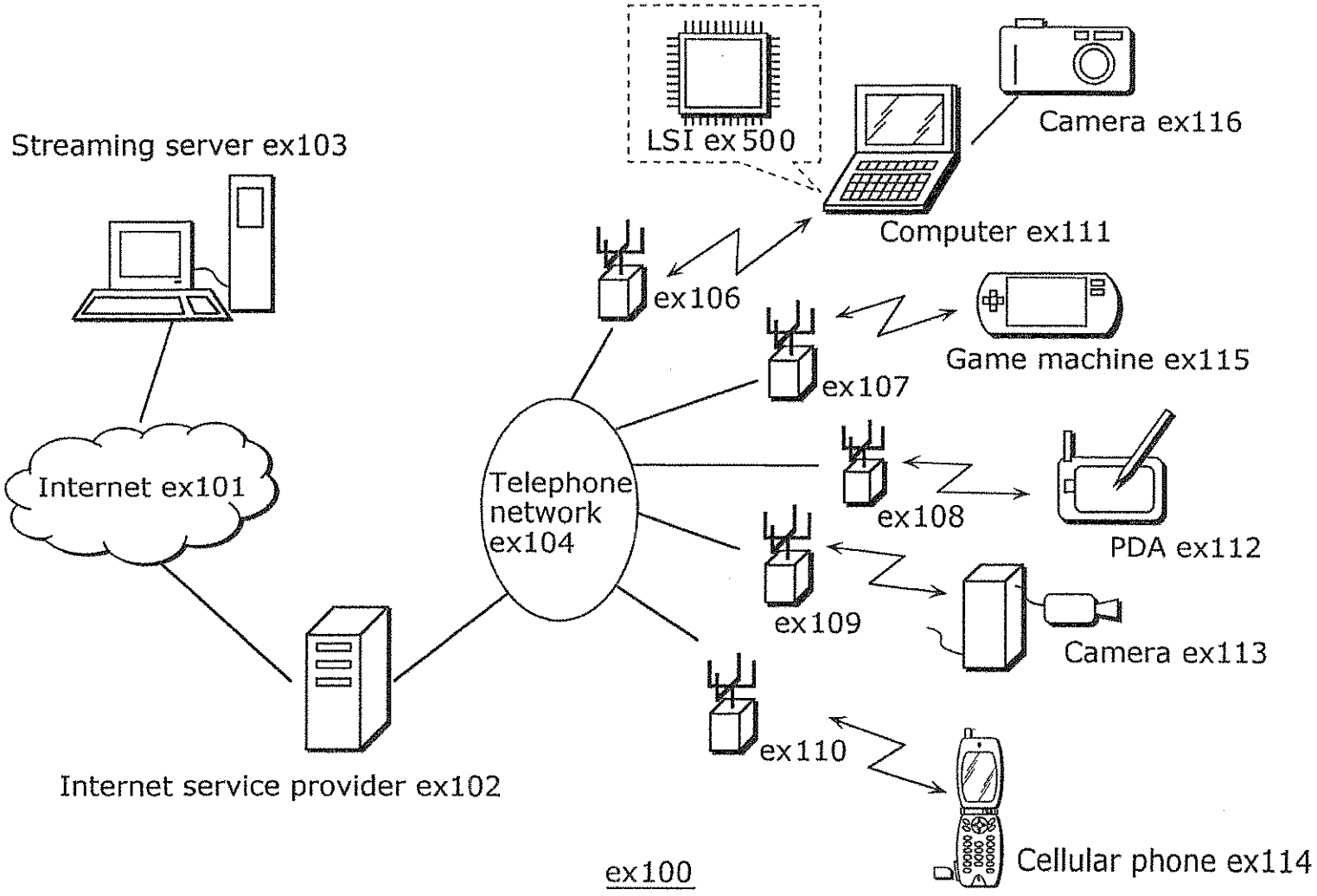

Streaming server ex103
LSI ex500
Camera ex116
Computer ex111
ex106
Game machine ex115
ex107
Internet ex101
Telephone network ex104
ex108
PDA ex112
ex109
Camera ex113
ex110
Internet service provider ex102
Cellular phone ex114
ex100

FIG. 30

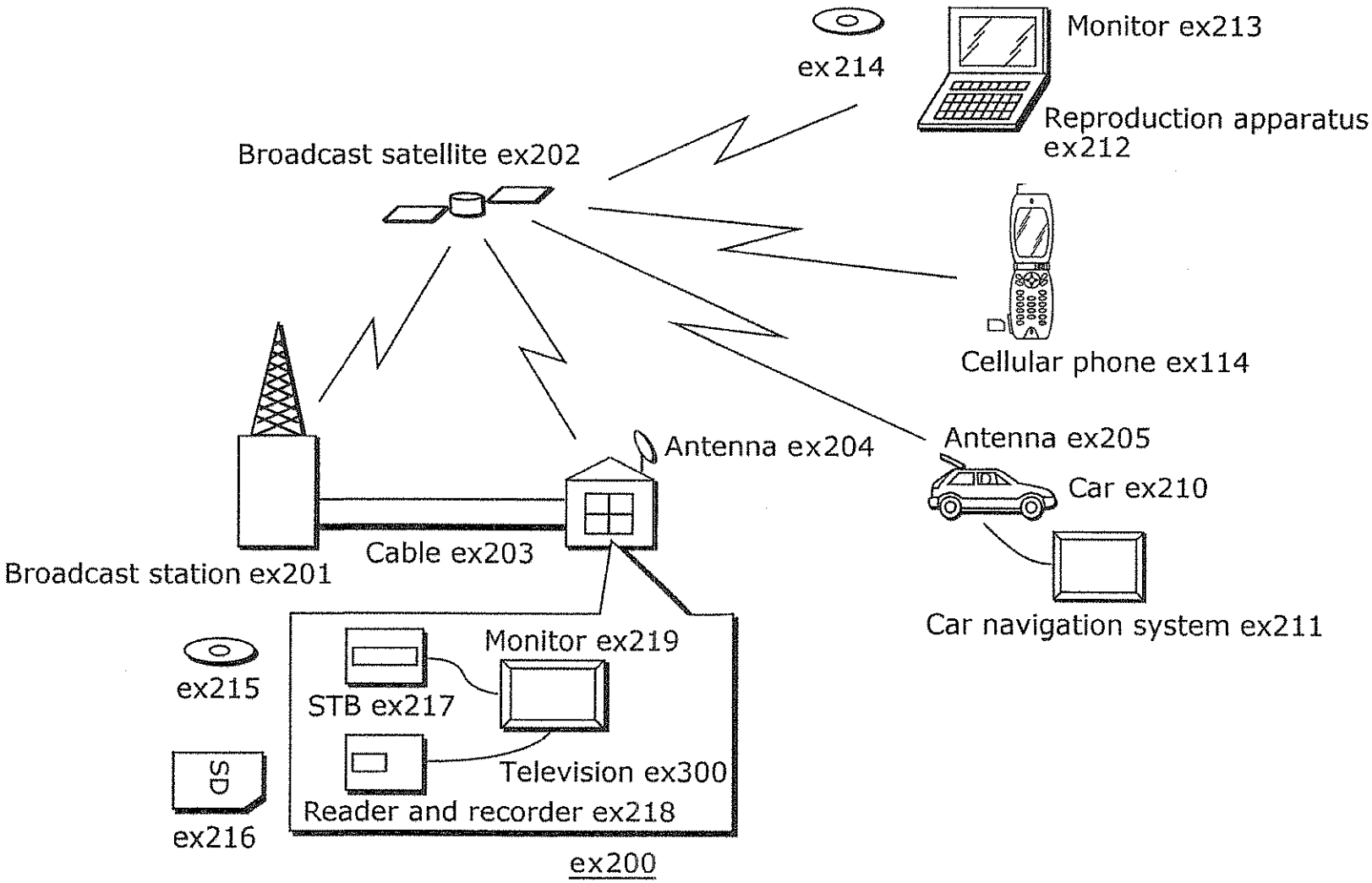

ex214
Monitor ex213
Reproduction apparatus ex212
Broadcast satellite ex202
Cellular phone ex114
Antenna ex204
Antenna ex205
Car ex210
Cable ex203
Broadcast station ex201
Car navigation system ex211
Monitor ex219
ex215
STB ex217
SD
Television ex300
Reader and recorder ex218
ex216
ex200

FIG. 31

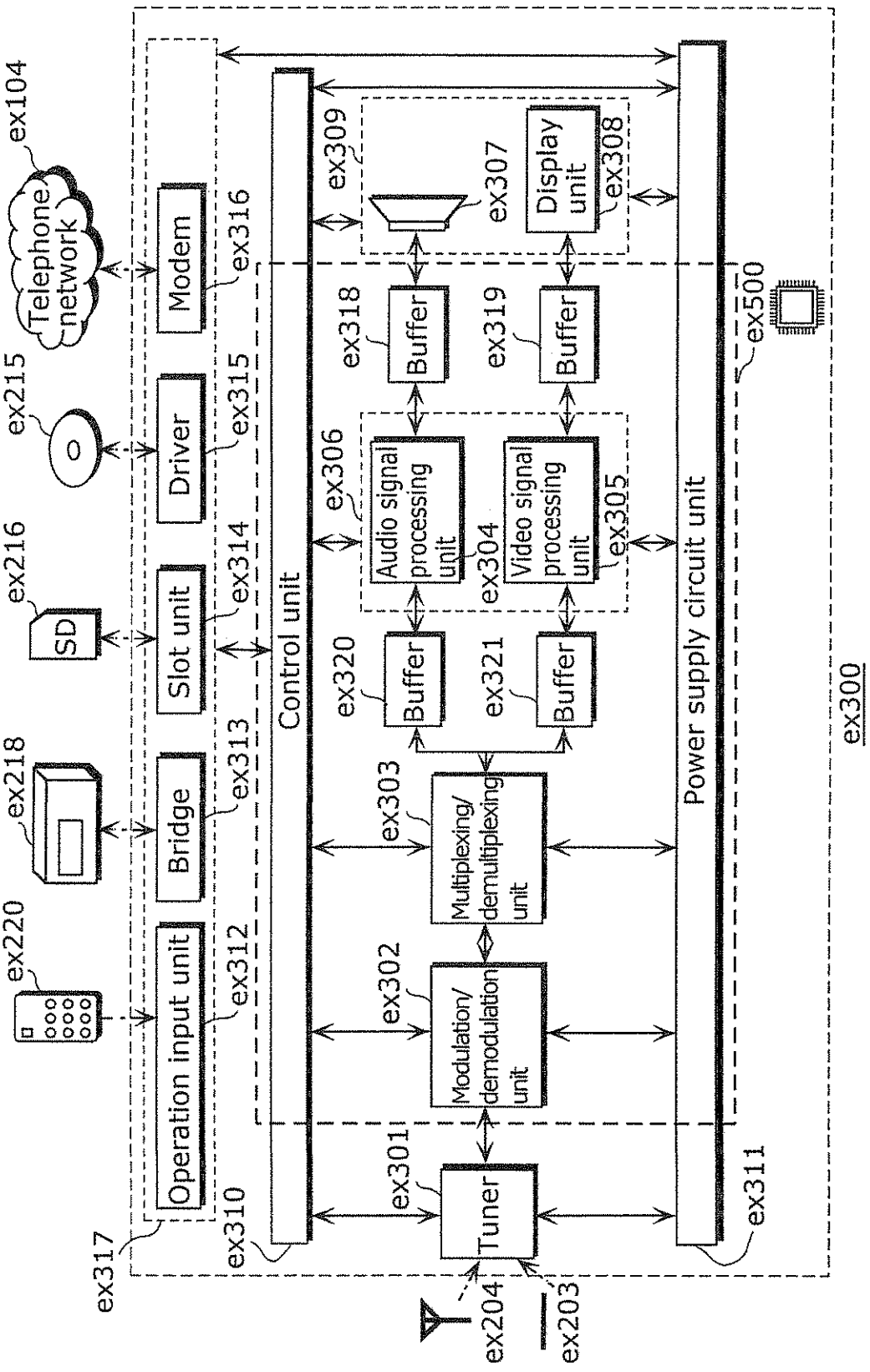

ex104
Telephone network
ex215
ex216
SD
ex218
ex220
ex317
Operation input unit
ex312
Bridge
ex313
Slot unit
ex314
Driver
ex315
Modem
ex316
Control unit
ex310
ex306
Audio signal processing unit
ex304
Video signal processing unit
ex305
ex307
ex309
Display unit
ex308
ex318
Buffer
ex319
Buffer
ex320
Buffer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

FIG. 32

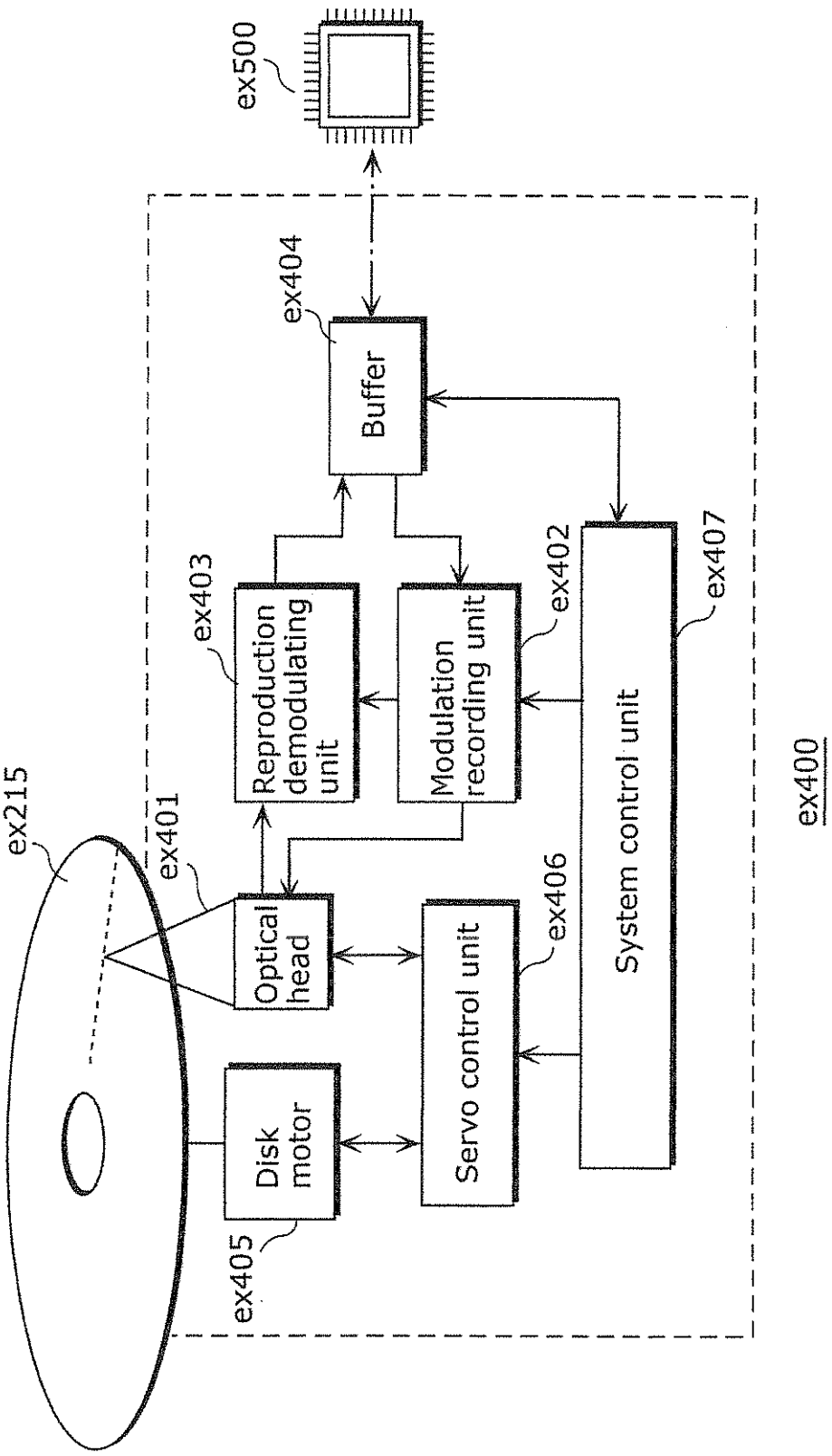

ex500
ex404
Buffer
ex403
Reproduction demodulating unit
ex402
Modulation recording unit
ex407
System control unit
ex215
ex401
Optical head
ex406
Servo control unit
Disk motor
ex405
ex400

FIG. 33

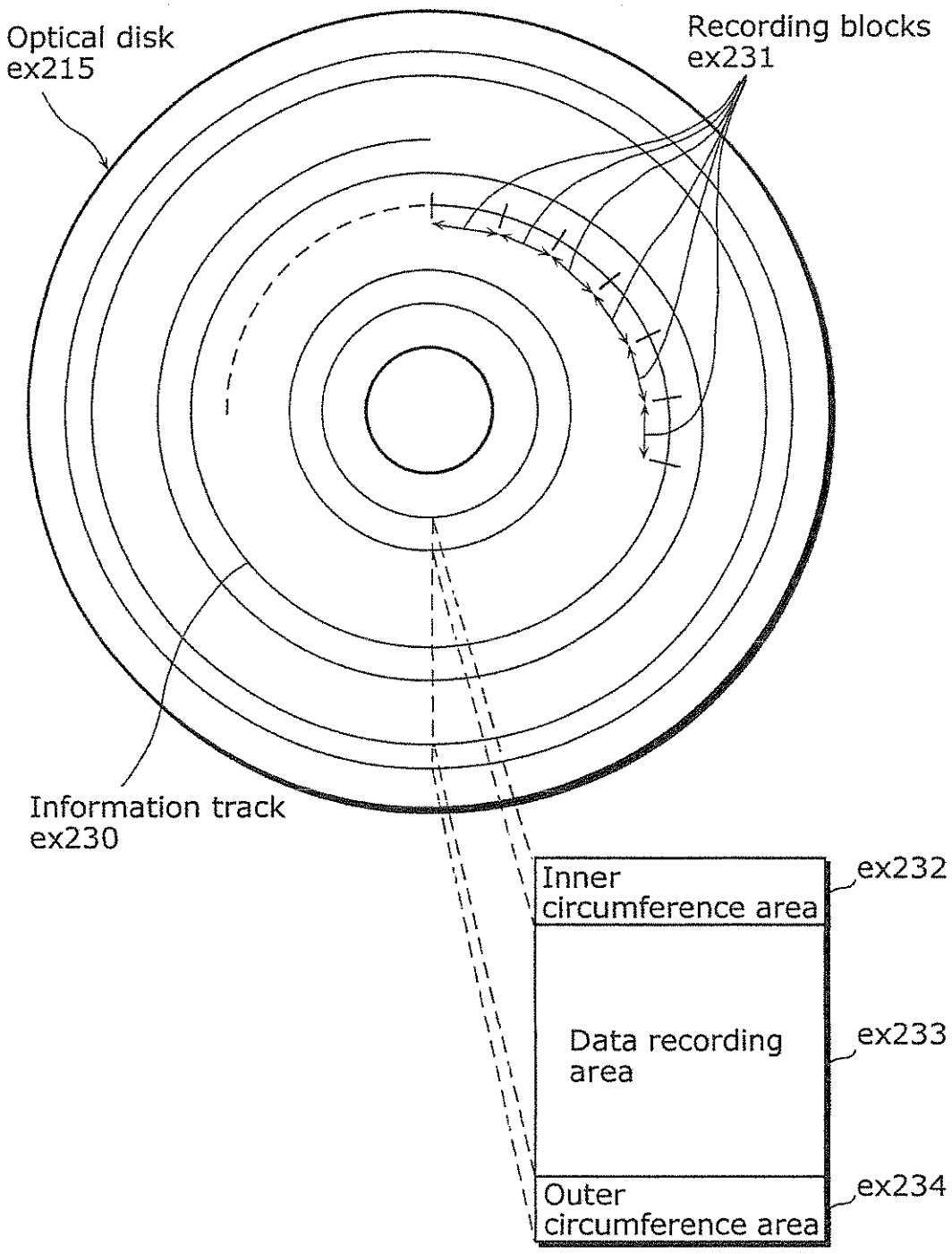

Optical disk
ex215
Recording blocks
ex231
Information track
ex230
Inner
circumference area
ex232
Data recording
area
ex233
Outer
circumference area
ex234

FIG. 34A

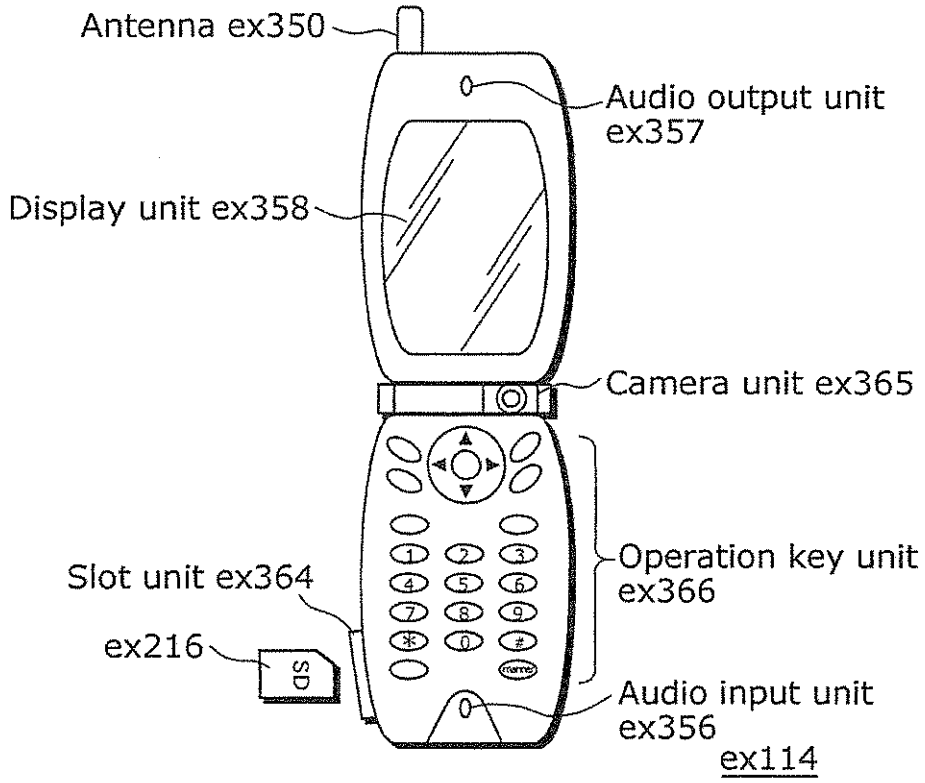


FIG. 34B

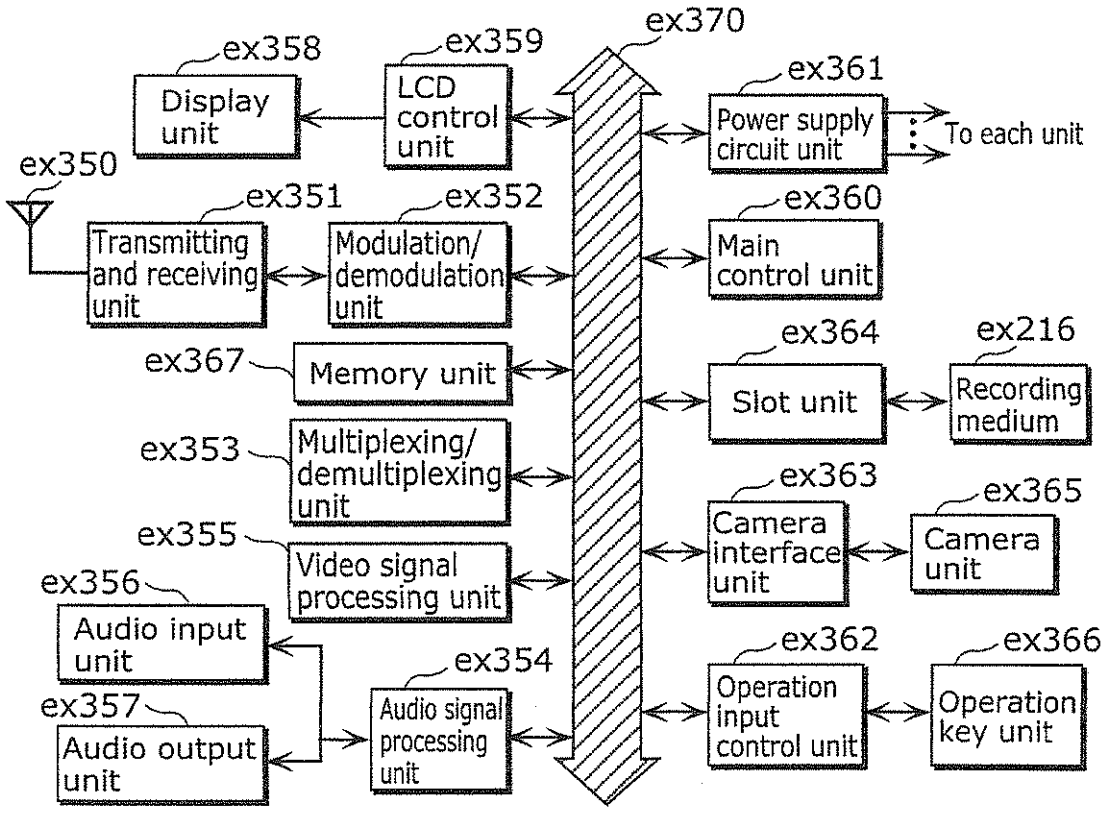


FIG. 35

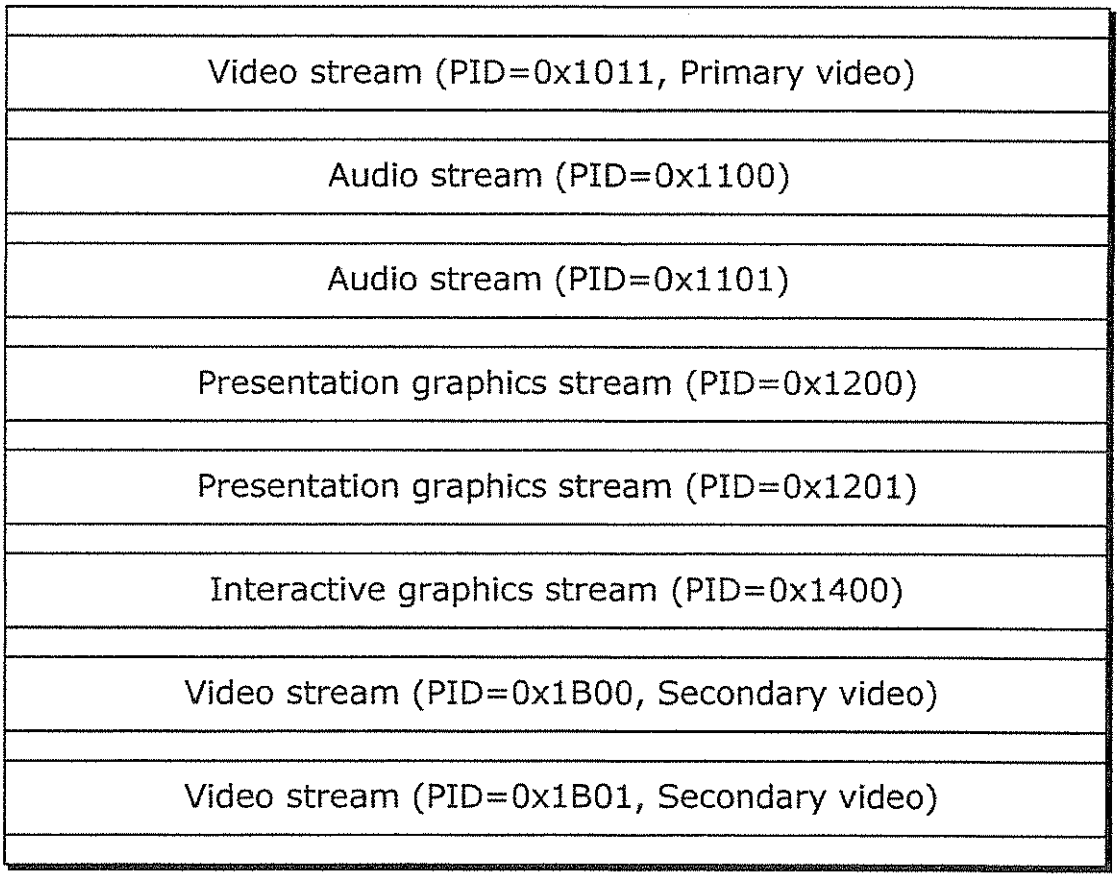

Video stream (PID=0x1011, Primary video)
Audio stream (PID=0x1100)
Audio stream (PID=0x1101)
Presentation graphics stream (PID=0x1200)
Presentation graphics stream (PID=0x1201)
Interactive graphics stream (PID=0x1400)
Video stream (PID=0x1B00, Secondary video)
Video stream (PID=0x1B01, Secondary video)

FIG. 36

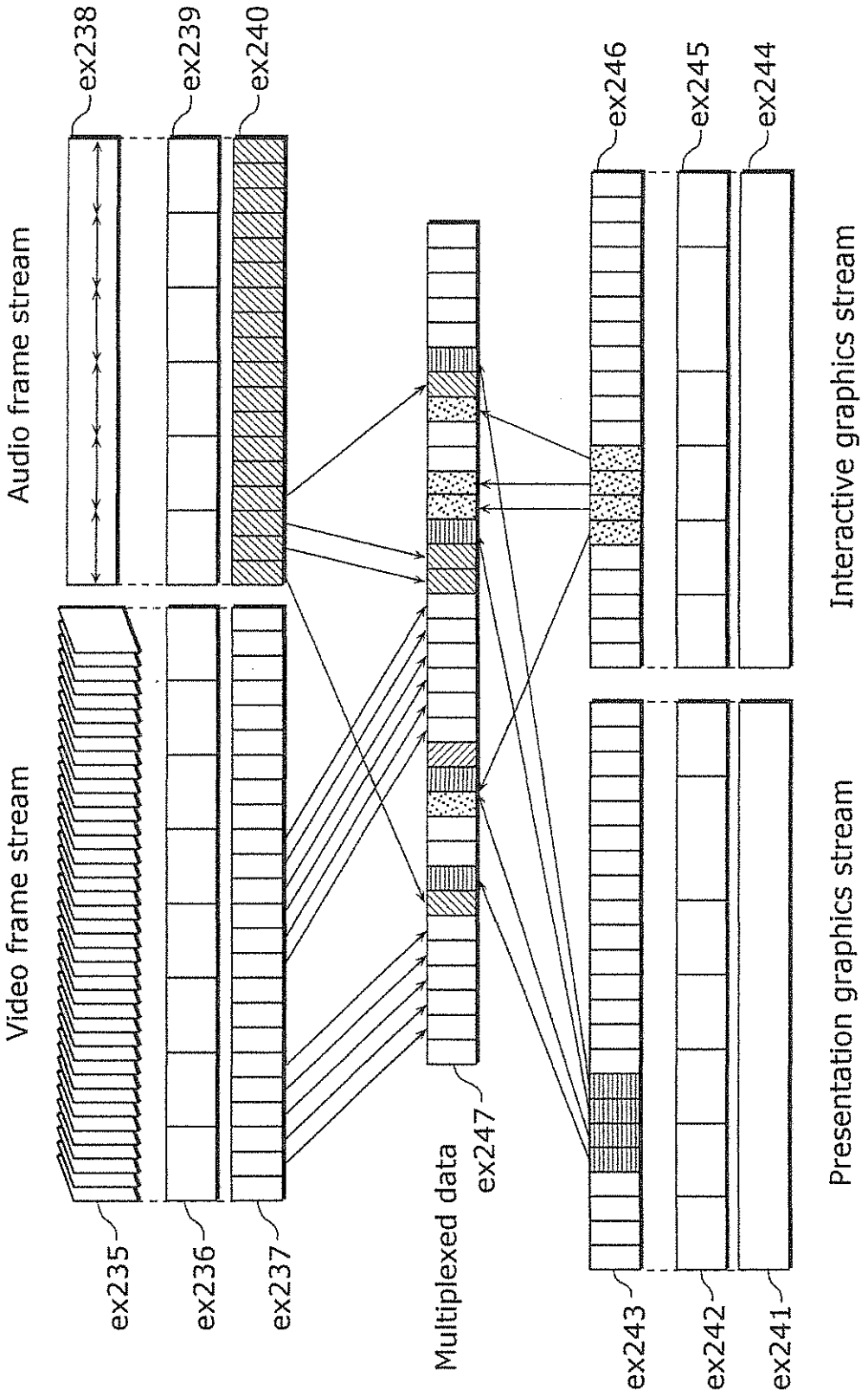

ex238
ex239
ex240
ex246
ex245
ex244
Audio frame stream
Video frame stream
Interactive graphics stream
Presentation graphics stream
Multiplexed data
ex247
ex235
ex236
ex237
ex243
ex242
ex241

FIG. 37

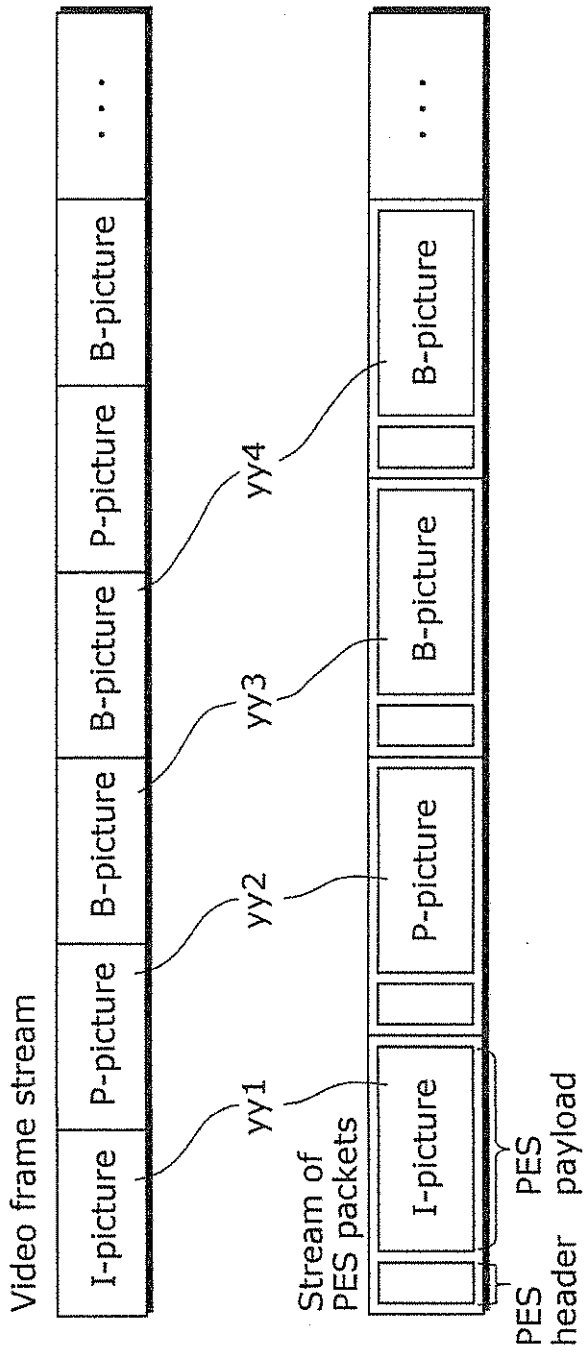

Video frame stream
I-picture
P-picture
B-picture
B-picture
P-picture
B-picture
. . .
yy1
yy2
yy3
yy4
Stream of PES packets
I-picture
P-picture
B-picture
B-picture
. . .
PES header
PES payload

FIG. 38

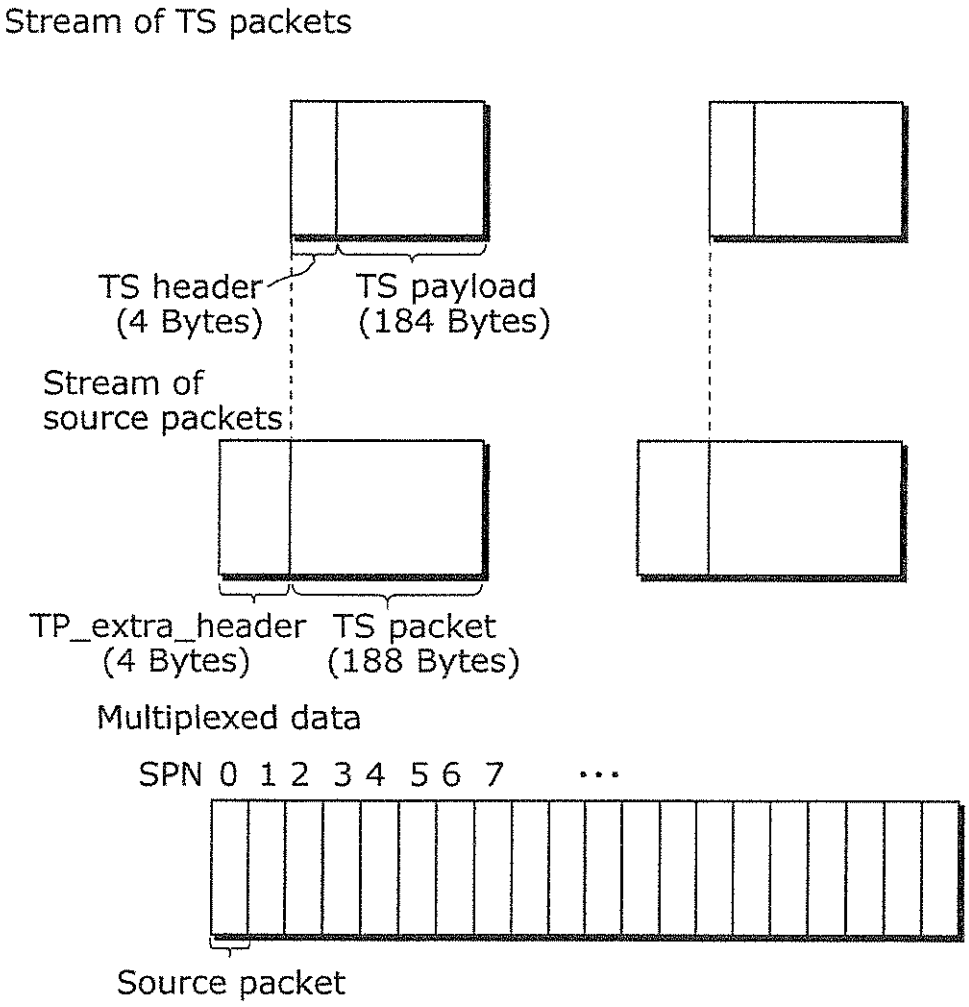

Stream of TS packets
TS header
(4 Bytes)
TS payload
(184 Bytes)
Stream of
source packets
TP_extra_header
(4 Bytes)
TS packet
(188 Bytes)
Multiplexed data
SPN 0 1 2 3 4 5 6 7 ...
Source packet

FIG. 39

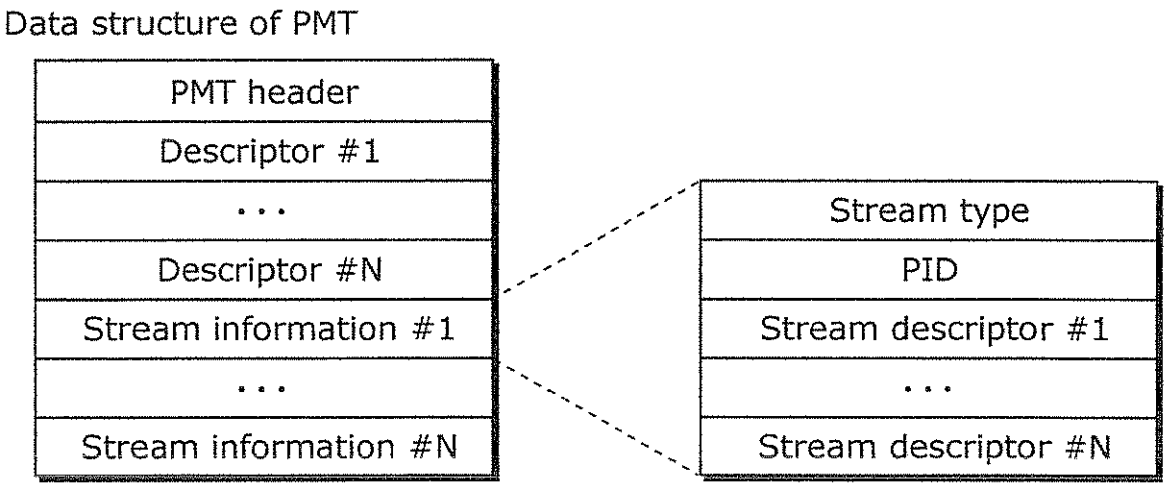

Data structure of PMT
PMT header
Descriptor #1
• • •
Descriptor #N
Stream information #1
• • •
Stream information #N
Stream type
PID
Stream descriptor #1
• • •
Stream descriptor #N

FIG. 40

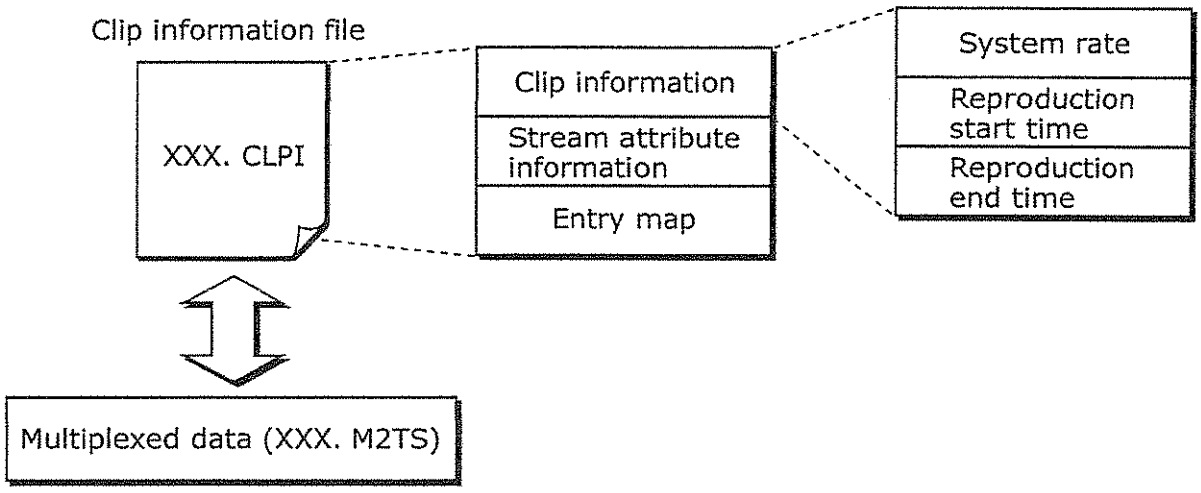

Clip information file
XXX. CLPI
Clip information
Stream attribute information
Entry map
System rate
Reproduction start time
Reproduction end time
Multiplexed data (XXX. M2TS)

FIG. 41

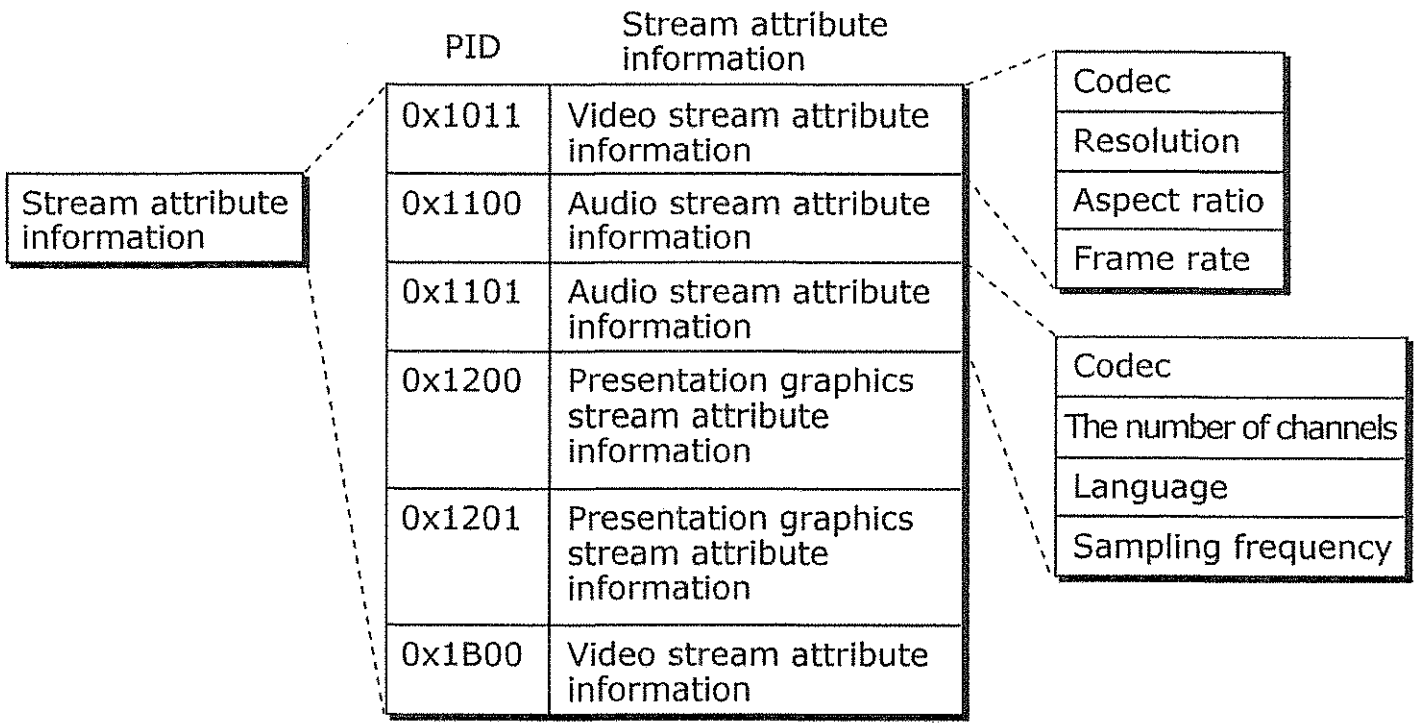

Stream attribute information
PID
Stream attribute information
0x1011
Video stream attribute information
0x1100
Audio stream attribute information
0x1101
Audio stream attribute information
0x1200
Presentation graphics stream attribute information
0x1201
Presentation graphics stream attribute information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

FIG. 42

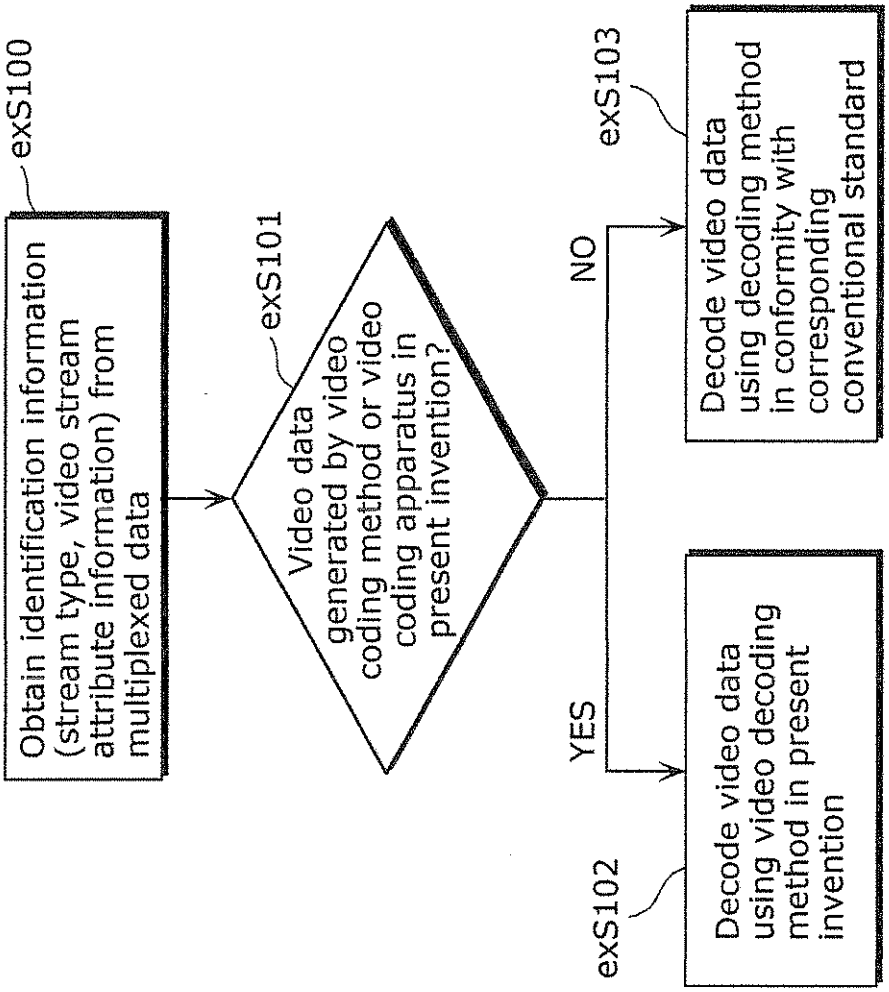

exS100
Obtain identification information (stream type, video stream attribute information) from multiplexed data
exS101
Video data generated by video coding method or video coding apparatus in present invention?
NO
exS103
Decode video data using decoding method in conformity with corresponding conventional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

FIG. 43

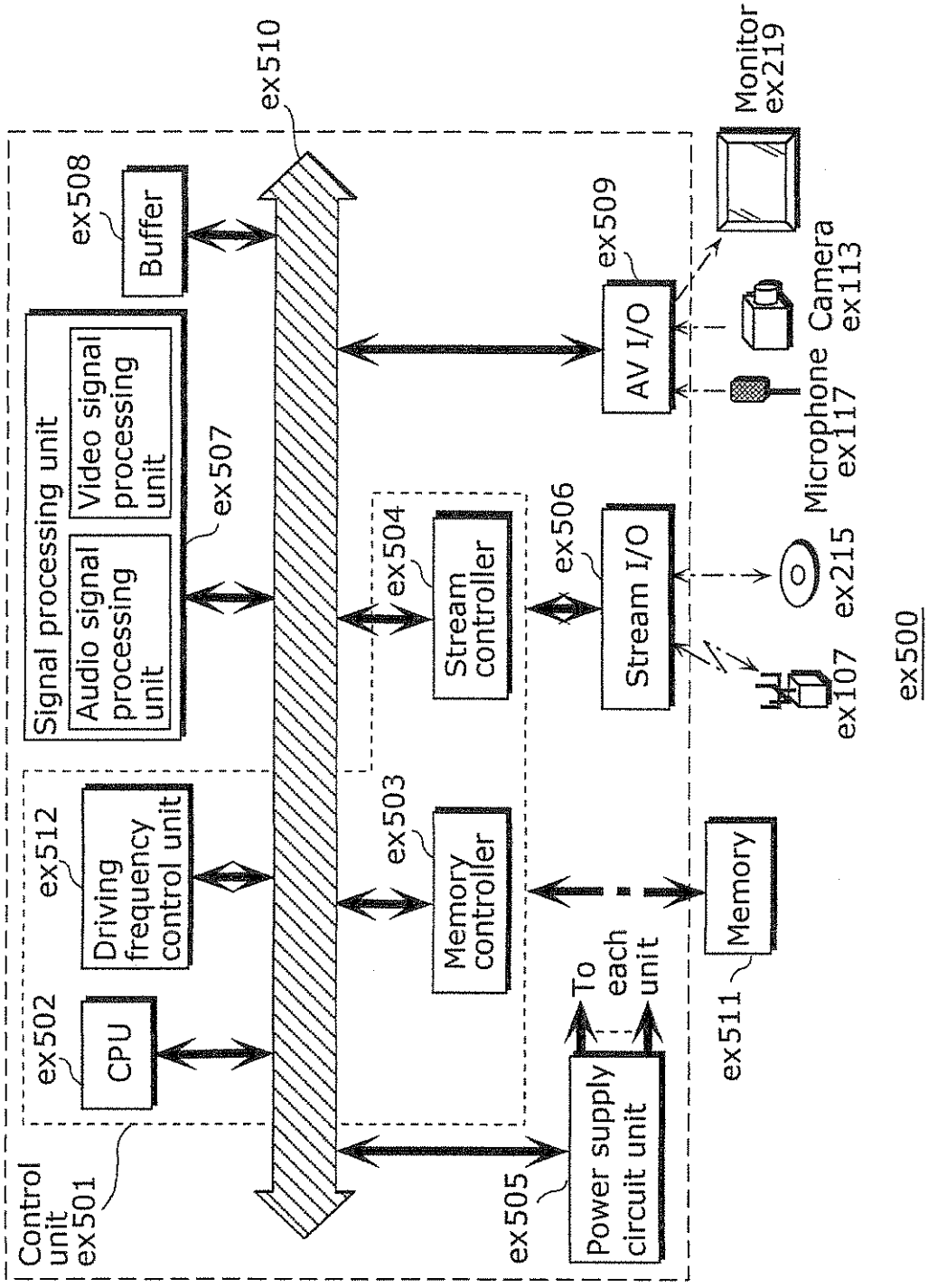
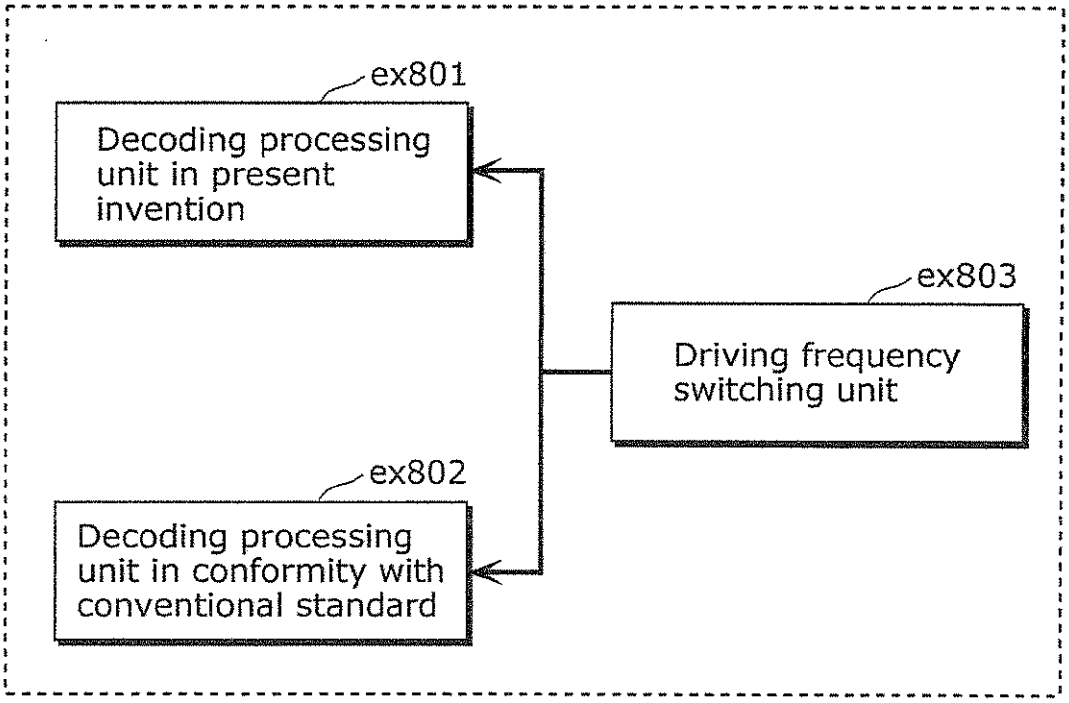

Control unit ex501
CPU ex502
Driving frequency control unit ex512
Signal processing unit
Audio signal processing unit
Video signal processing unit ex507
Buffer ex508
Memory controller ex503
Stream controller ex504
Power supply circuit unit ex505
To each unit
Stream I/O ex506
AV I/O ex509
Memory ex511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

FIG. 44


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

ex800

FIG. 45

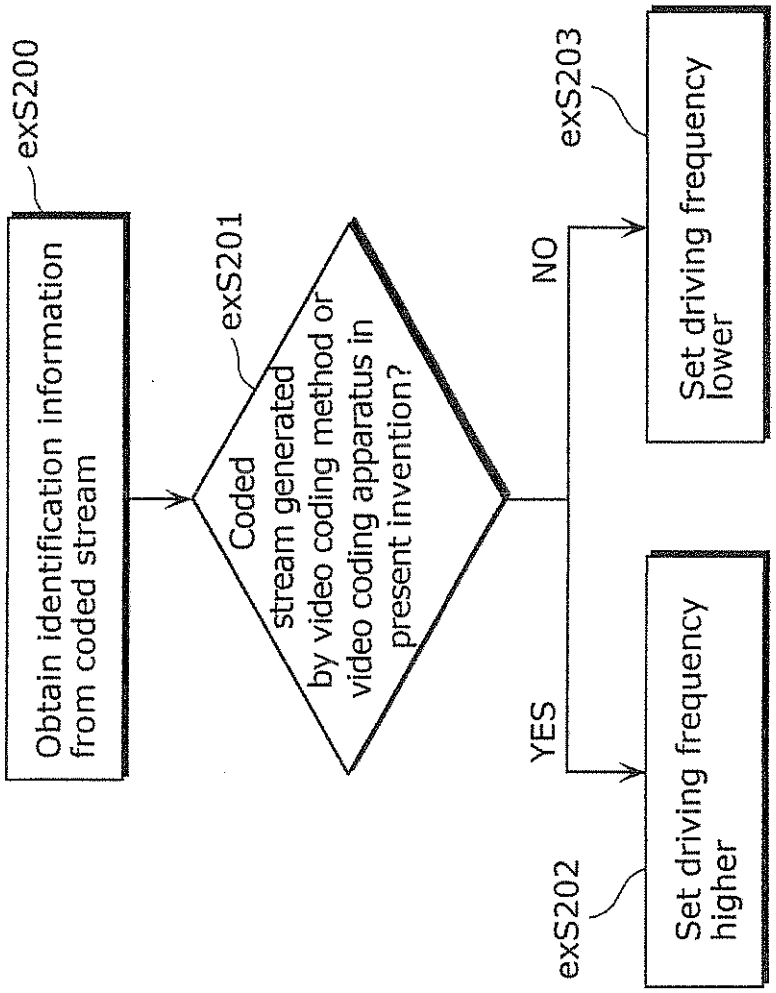

exS200
Obtain identification information from coded stream
exS201
Coded stream generated by video coding method or video coding apparatus in present invention?
YES
NO
exS202
Set driving frequency higher
exS203
Set driving frequency lower

FIG. 46

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

FIG. 47A

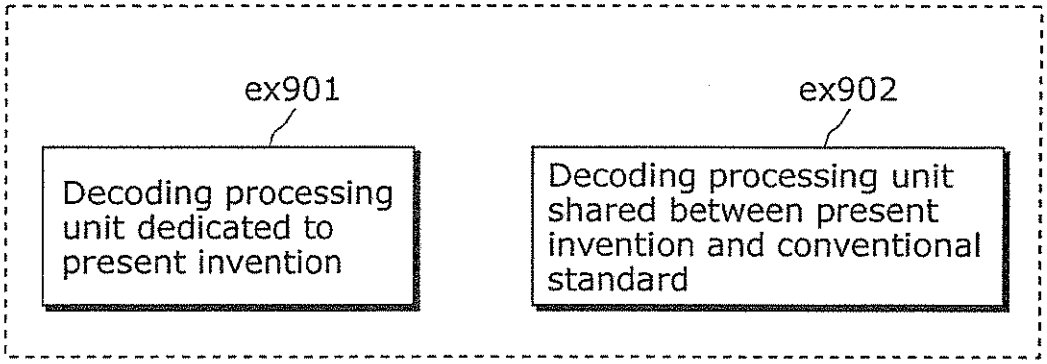


FIG. 47B

