FIG. 1

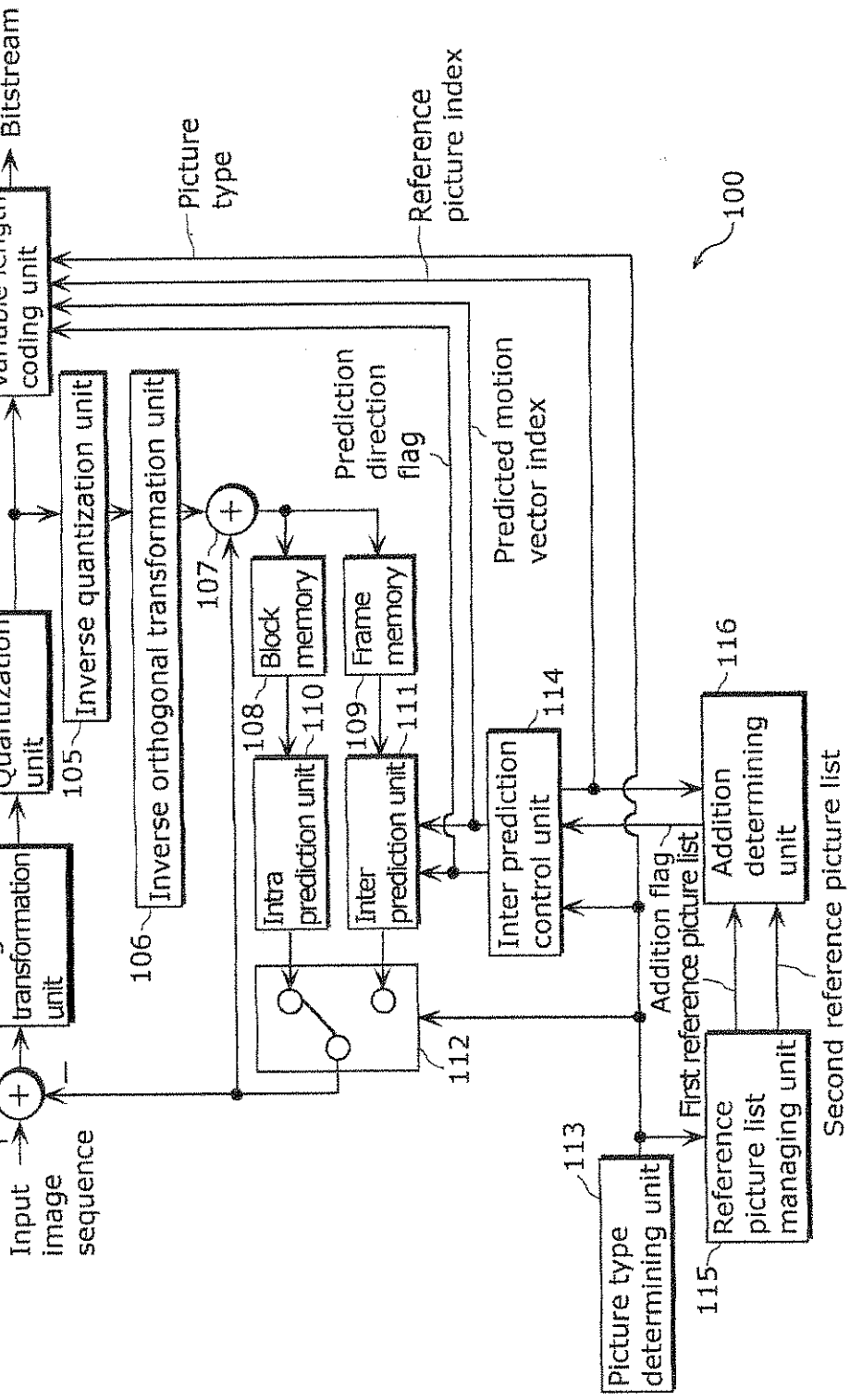

Input image sequence
101
Orthogonal transformation unit
102
Quantization unit
103
Variable length coding unit
104
Bitstream
Inverse quantization unit
105
Inverse orthogonal transformation unit
106
107
Intra prediction unit
108
Inter prediction unit
109
Block memory
110
Frame memory
111
112
Picture type
Reference picture index
Prediction direction flag
Predicted motion vector index
Inter prediction control unit
114
Addition flag
First reference picture list
Second reference picture list
Addition determining unit
116
Reference picture list managing unit
115
Picture type determining unit
113
100

FIG. 2

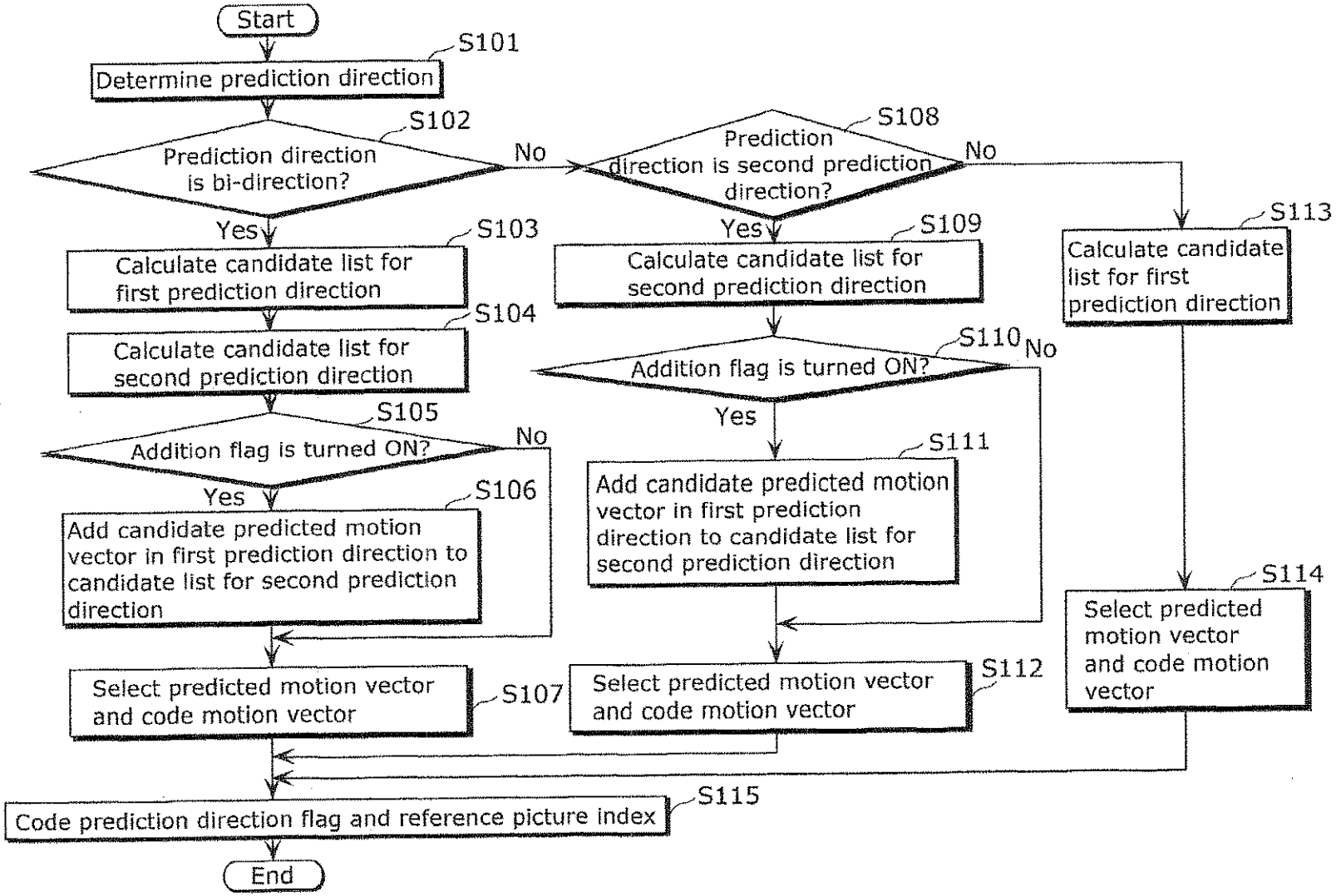

Start
S101
Determine prediction direction
S102
Prediction direction is bi-direction?
No
Yes
S103
Calculate candidate list for first prediction direction
S104
Calculate candidate list for second prediction direction
S105
Addition flag is turned ON?
No
Yes
S106
Add candidate predicted motion vector in first prediction direction to candidate list for second prediction direction
S107
Select predicted motion vector and code motion vector
S108
Prediction direction is second prediction direction?
No
Yes
S109
Calculate candidate list for second prediction direction
S110
Addition flag is turned ON?
No
Yes
S111
Add candidate predicted motion vector in first prediction direction to candidate list for second prediction direction
S112
Select predicted motion vector and code motion vector
S113
Calculate candidate list for first prediction direction
S114
Select predicted motion vector and code motion vector
S115
Code prediction direction flag and reference picture index
End

FIG. 3

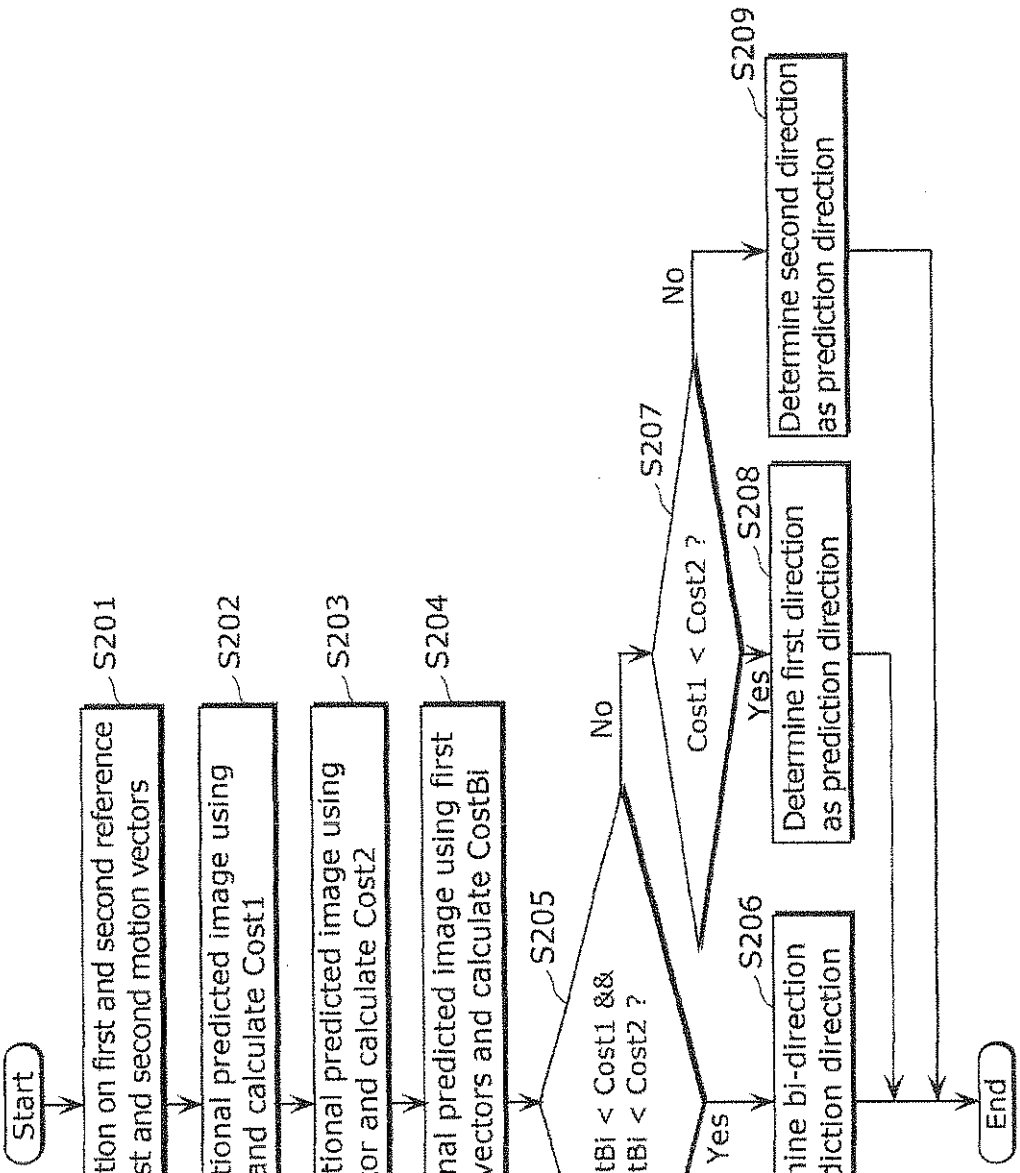

Start
Perform motion estimation on first and second reference pictures to generate first and second motion vectors
S201
Generate one-directional predicted image using first motion vector and calculate Cost1
S202
Generate one-directional predicted image using second motion vector and calculate Cost2
S203
Generate bi-directional predicted image using first and second motion vectors and calculate CostBi
S204
CostBi < Cost1 && CostBi < Cost2 ?
S205
Yes
No
Determine bi-direction as prediction direction
S206
Cost1 < Cost2 ?
S207
Yes
No
Determine first direction as prediction direction
S208
Determine second direction as prediction direction
S209
End

FIG. 4

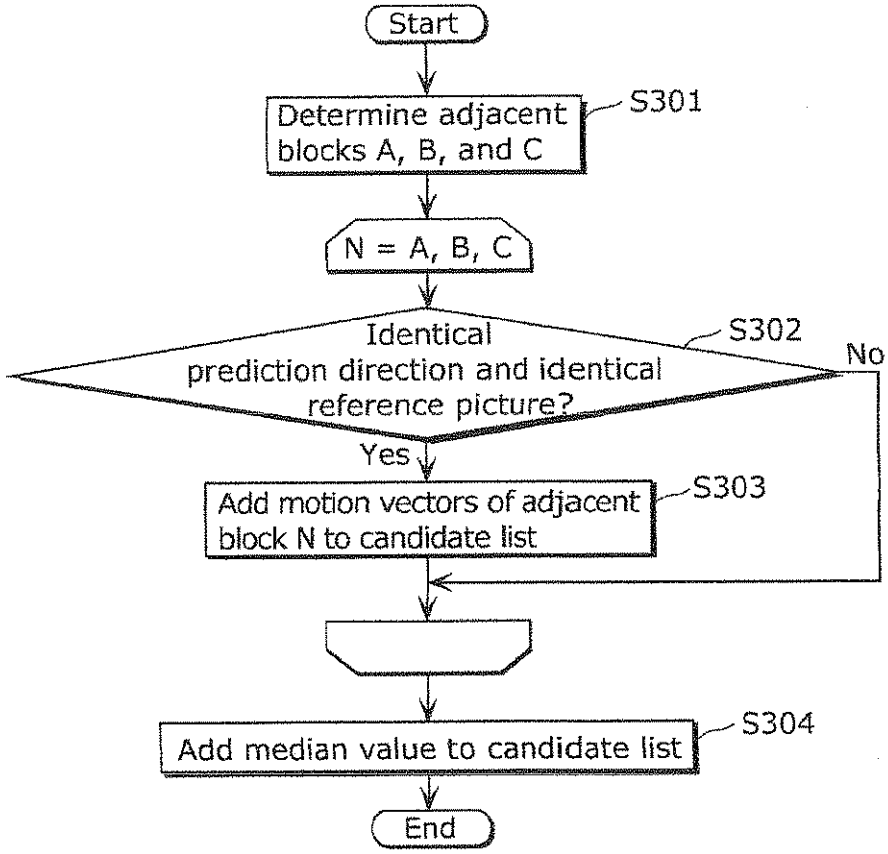

Start
Determine adjacent blocks A, B, and C
S301
N = A, B, C
Identical prediction direction and identical reference picture?
S302
No
Yes
Add motion vectors of adjacent block N to candidate list
S303
Add median value to candidate list
S304
End

FIG. 5

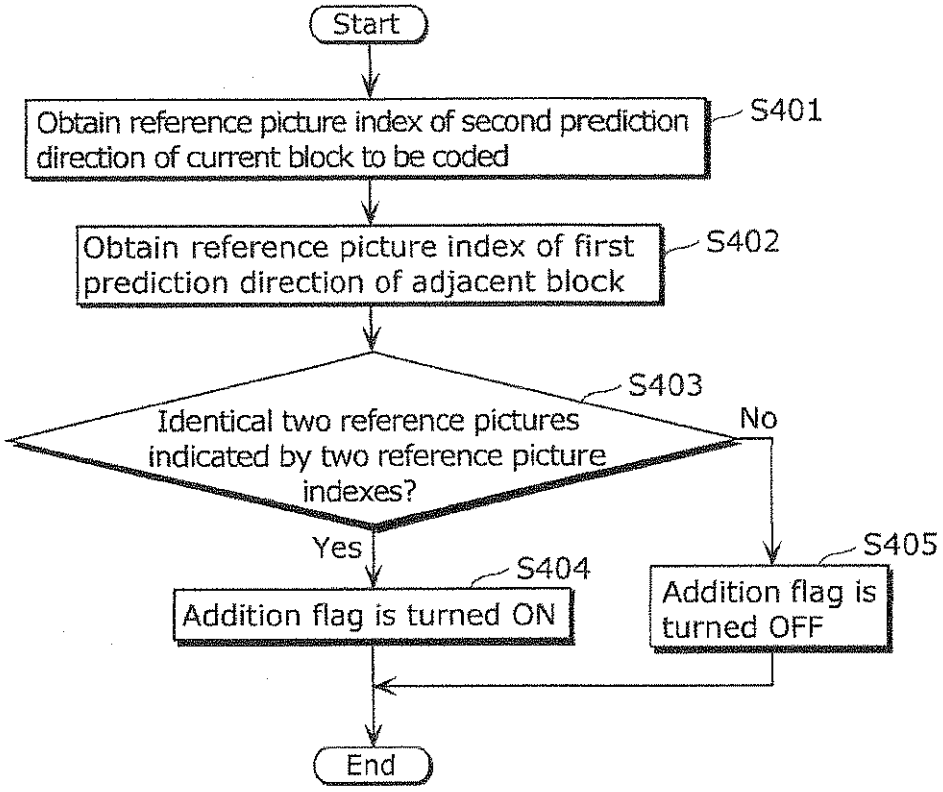


FIG. 6A

Candidate list for first prediction direction

Predicted motion vector index	Candidate predicted motion vector
0	Median (MvL0_A, MvL0_B, MvL0_C)
1	MvL0_A
2	MvL0_B
3	MvL0_C

FIG. 6B

Candidate list for second prediction direction

Predicted motion vector index	Candidate predicted motion vector
0	Median (MvL1_A, MvL0_B, MvL1_C)
1	MvL1_A
2	MvL0_B
3	MvL1_C

FIG. 7

Predicted motion vector index	Allocated bitstream
0	0
1	10
2	110
3	1110
4	11110

FIG. 8

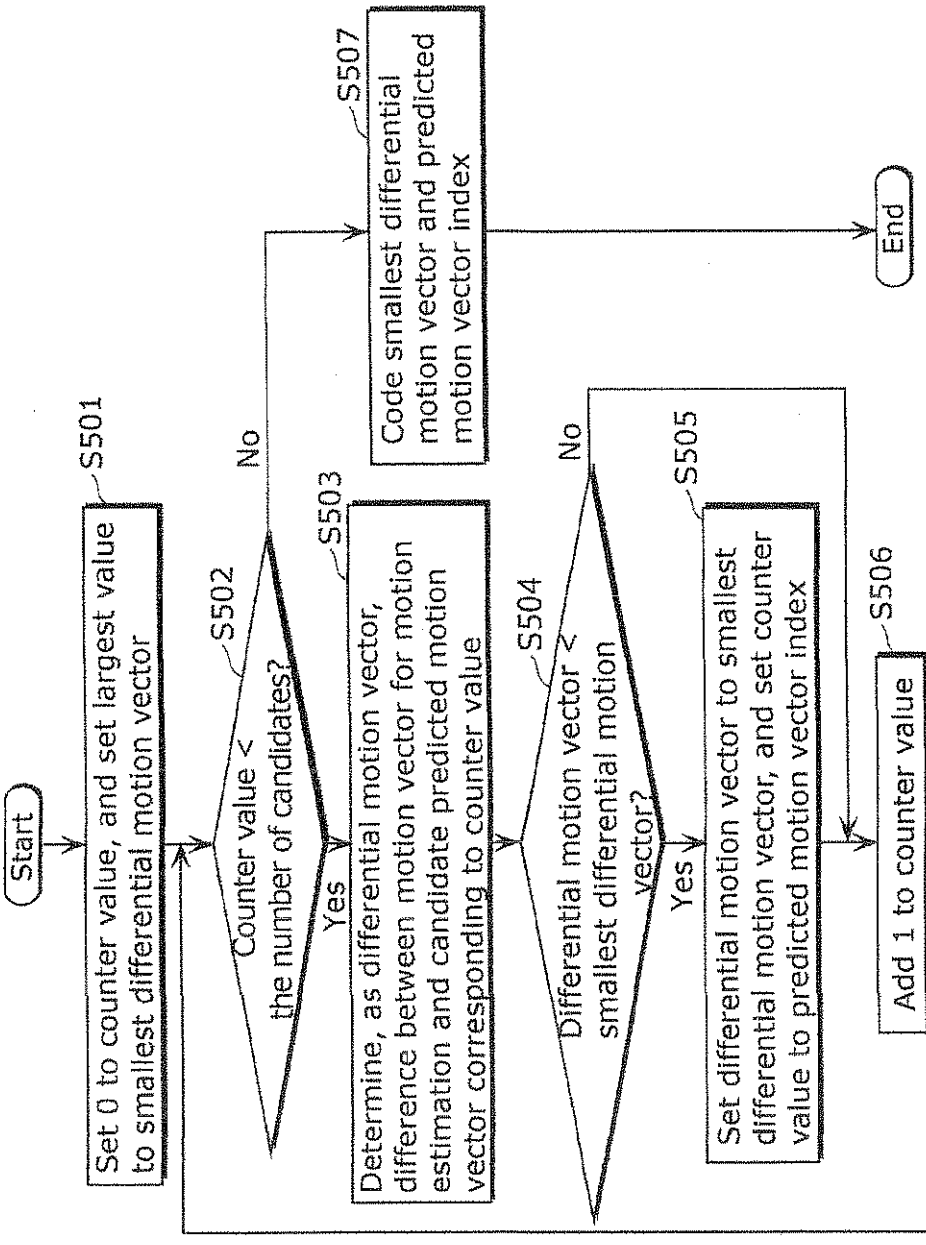

Start
Set 0 to counter value, and set largest value to smallest differential motion vector
S501
Counter value < the number of candidates?
S502
No
Yes
Determine, as differential motion vector, difference between motion vector for motion estimation and candidate predicted motion vector corresponding to counter value
S503
Differential motion vector < smallest differential motion vector?
S504
No
Yes
Set differential motion vector to smallest differential motion vector, and set counter value to predicted motion vector index
S505
Add 1 to counter value
S506
Code smallest differential motion vector and predicted motion vector index
S507
End

FIG. 9

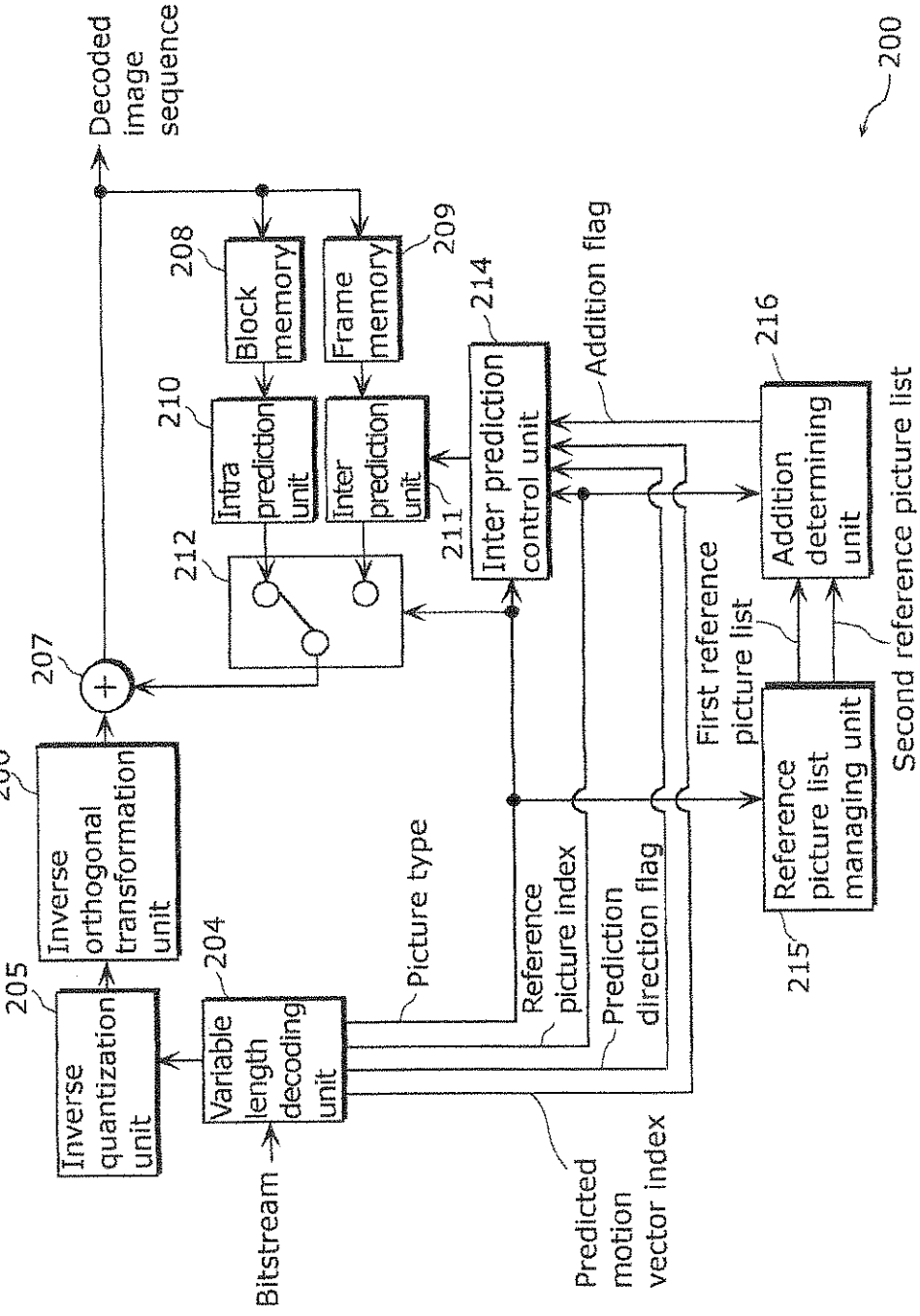

200
Decoded image sequence
208
Block memory
209
Frame memory
210
Intra prediction unit
Inter prediction unit
211
212
214
Inter prediction control unit
Addition flag
216
Addition determining unit
First reference picture list
Second reference picture list
207
206
Inverse orthogonal transformation unit
205
Inverse quantization unit
204
Variable length decoding unit
Bitstream
Picture type
Reference picture index
Prediction direction flag
Predicted motion vector index
215
Reference picture list managing unit

FIG. 10

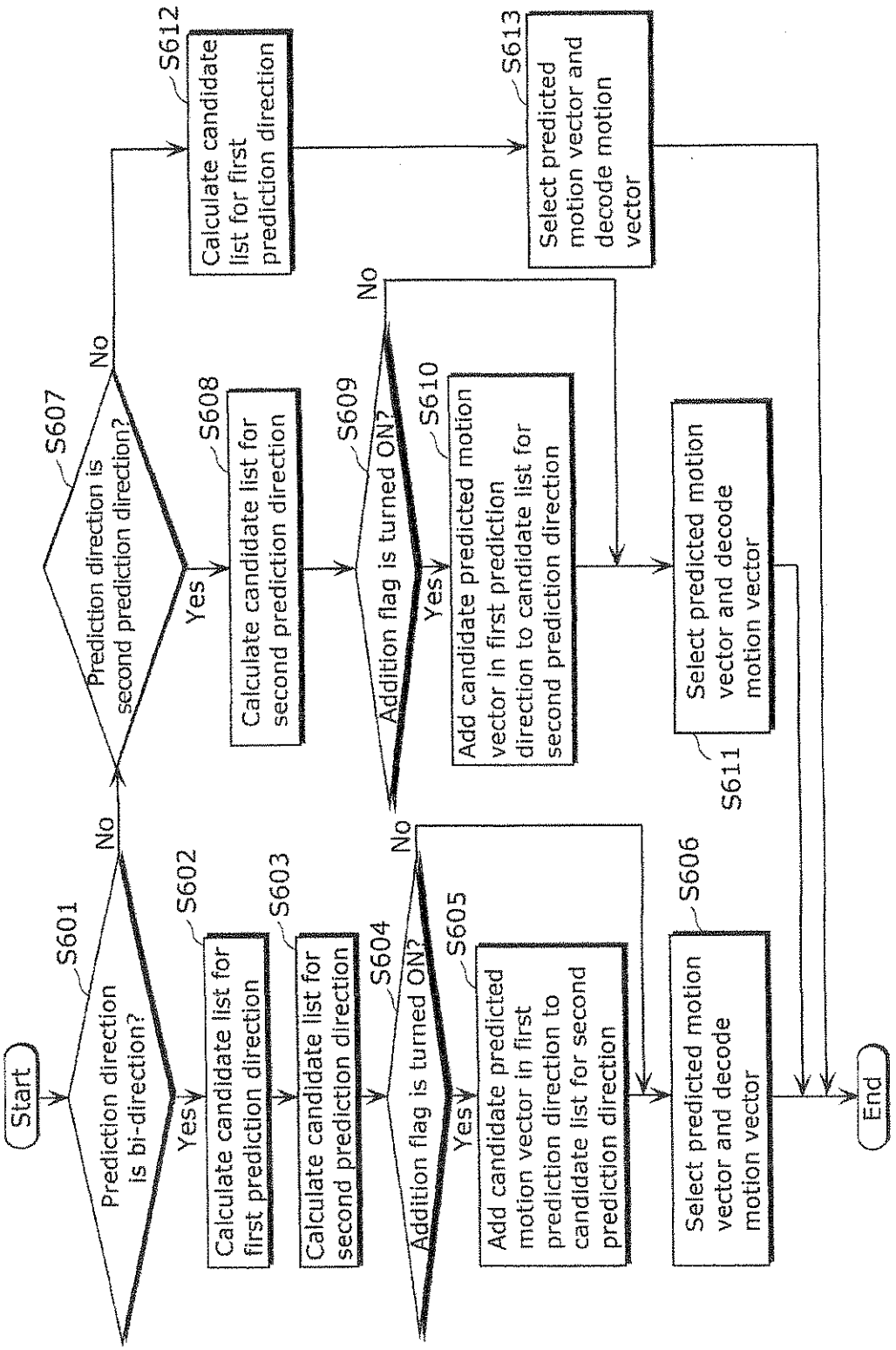

Start
S601
Prediction direction is bi-direction?
Yes
No
S602
Calculate candidate list for first prediction direction
S603
Calculate candidate list for second prediction direction
S604
Addition flag is turned ON?
Yes
No
S605
Add candidate predicted motion vector in first prediction direction to candidate list for second prediction direction
S606
Select predicted motion vector and decode motion vector
S607
Prediction direction is second prediction direction?
Yes
No
S608
Calculate candidate list for second prediction direction
S609
Addition flag is turned ON?
Yes
No
S610
Add candidate predicted motion vector in first prediction direction to candidate list for second prediction direction
S611
Select predicted motion vector and decode motion vector
S612
Calculate candidate list for first prediction direction
S613
Select predicted motion vector and decode motion vector
End

FIG. 11A

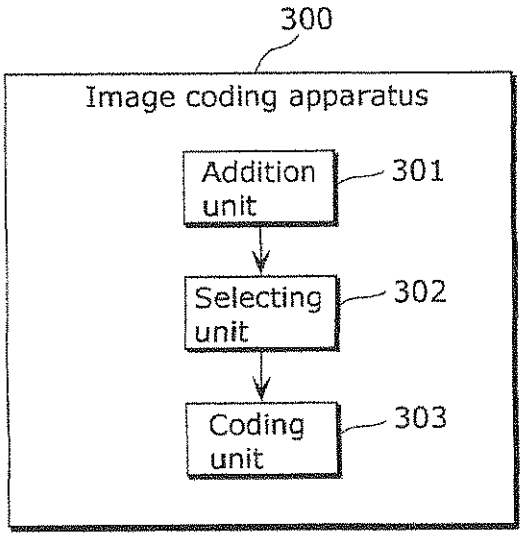


FIG. 11B

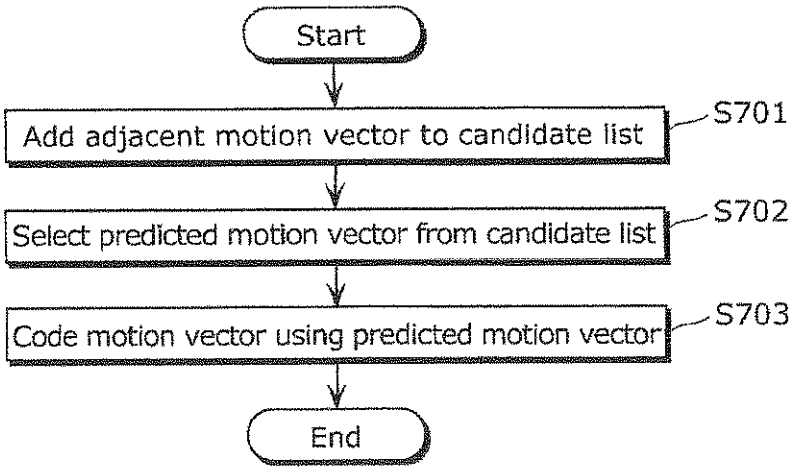


FIG. 12A

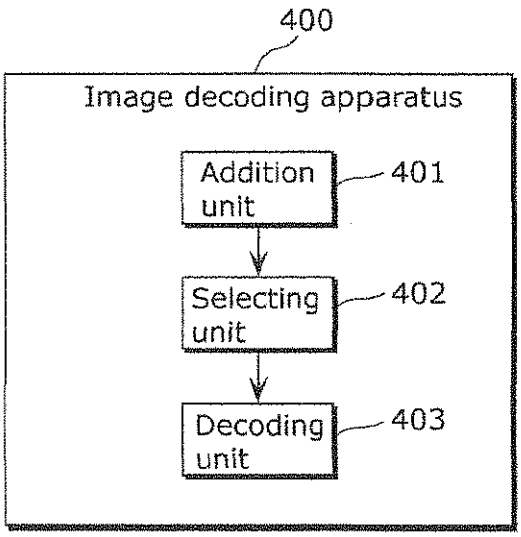


FIG. 12B

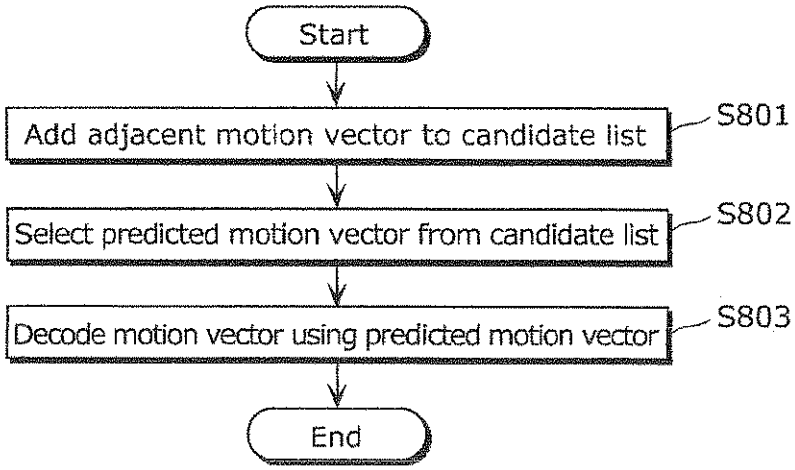


FIG. 13

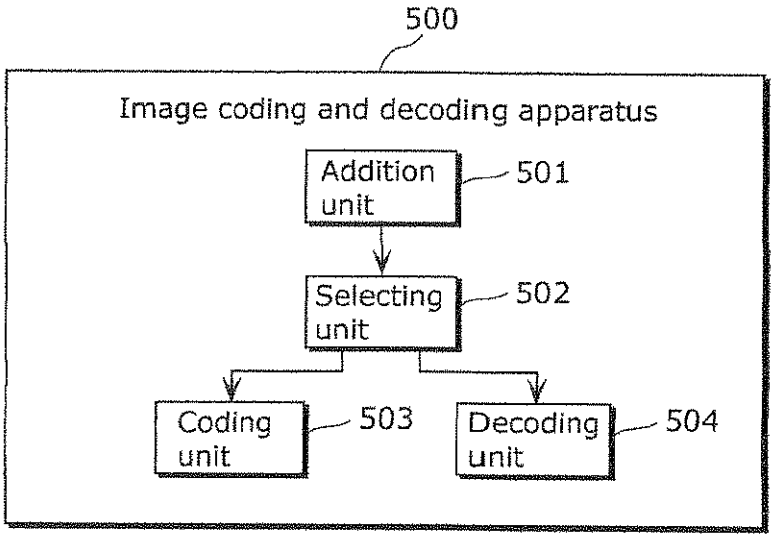

500
Image coding and decoding apparatus
Addition unit
501
Selecting unit
502
Coding unit
503
Decoding unit
504

FIG. 14

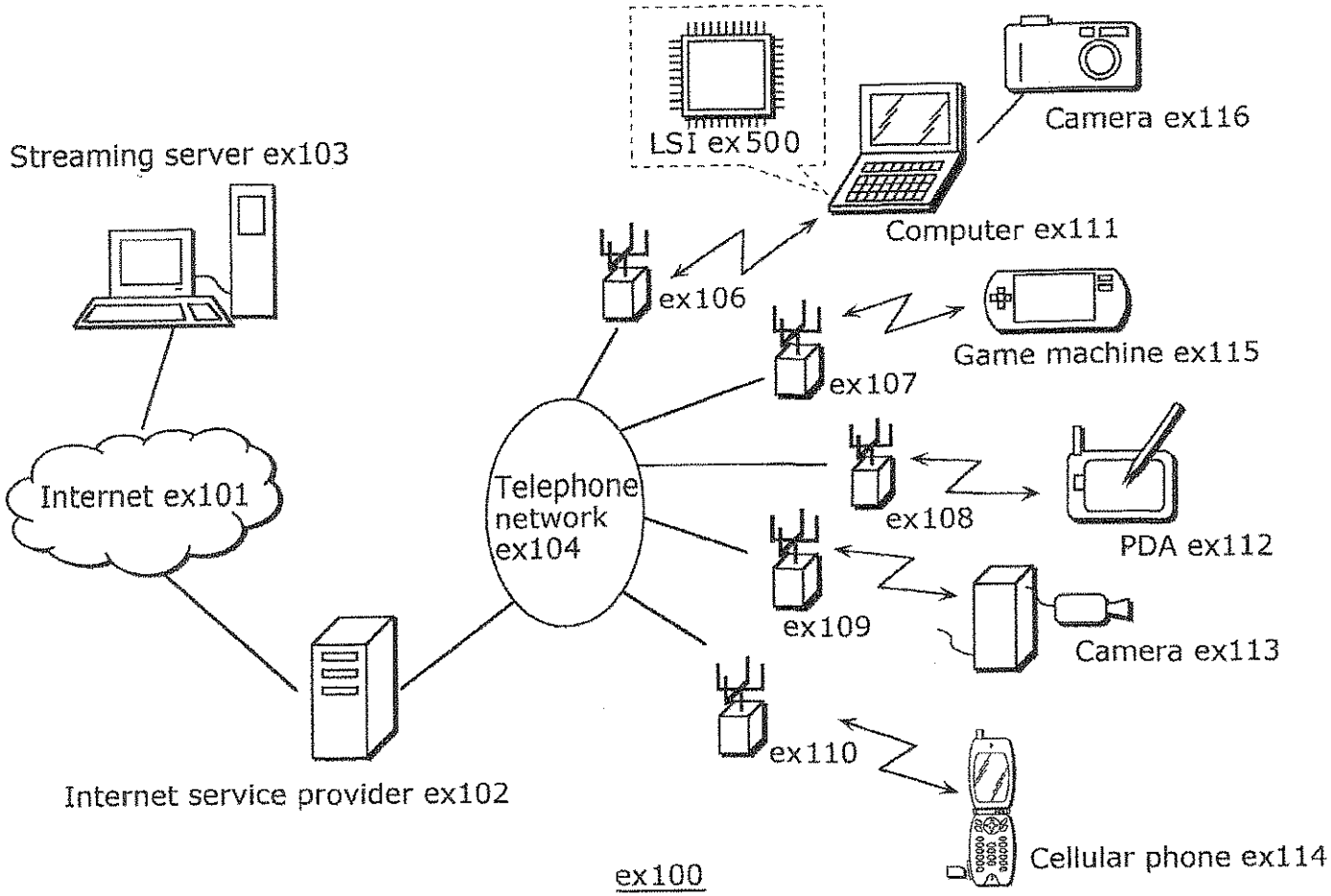

Streaming server ex103
LSI ex500
Camera ex116
Computer ex111
ex106
Game machine ex115
ex107
Internet ex101
Telephone network ex104
ex108
PDA ex112
ex109
Camera ex113
ex110
Internet service provider ex102
Cellular phone ex114
ex100

FIG. 15

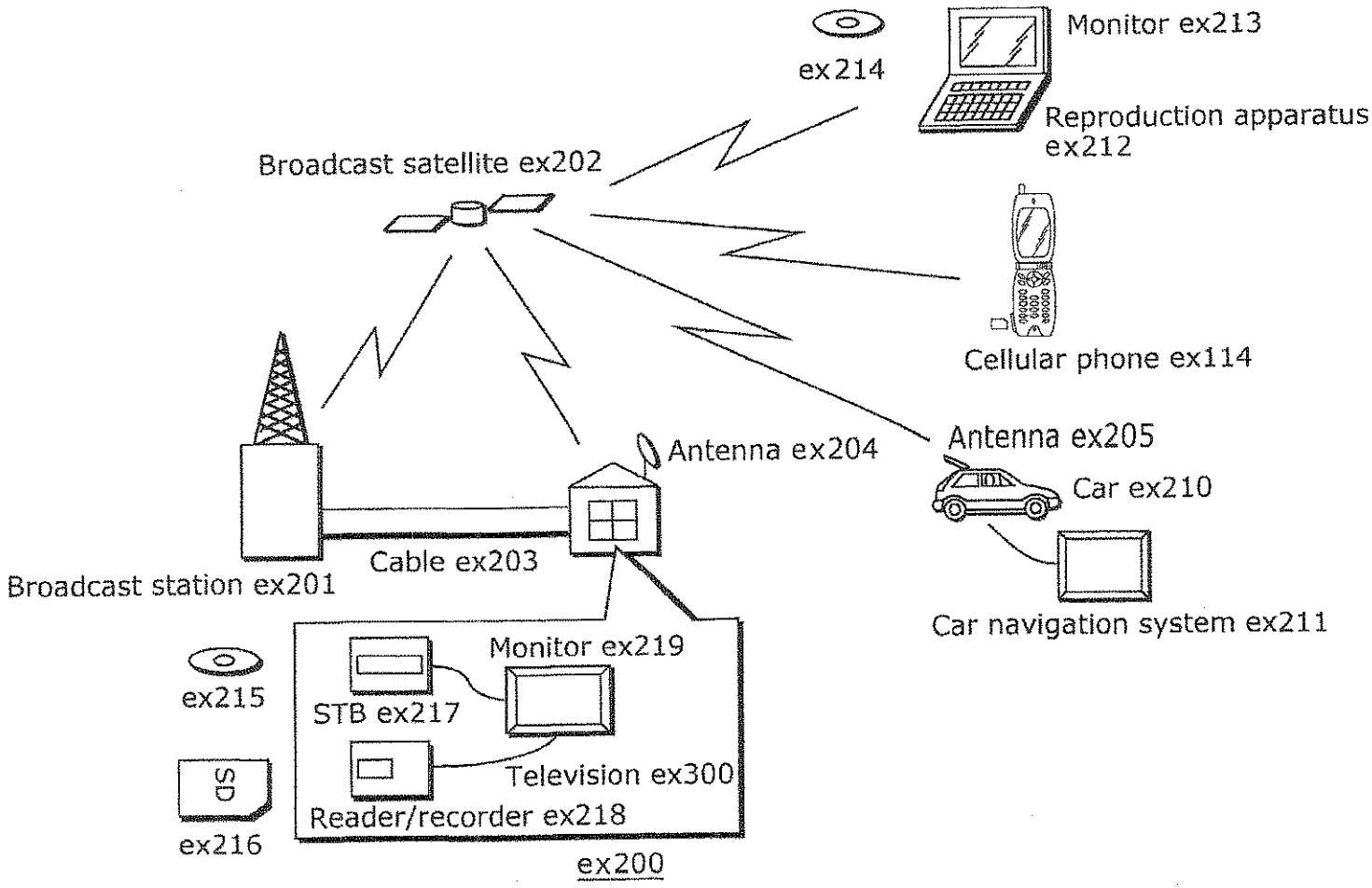

ex214
Monitor ex213
Reproduction apparatus ex212
Broadcast satellite ex202
Cellular phone ex114
Antenna ex204
Antenna ex205
Car ex210
Cable ex203
Broadcast station ex201
Car navigation system ex211
Monitor ex219
ex215
STB ex217
Television ex300
SD
Reader/recorder ex218
ex216
ex200

FIG. 16

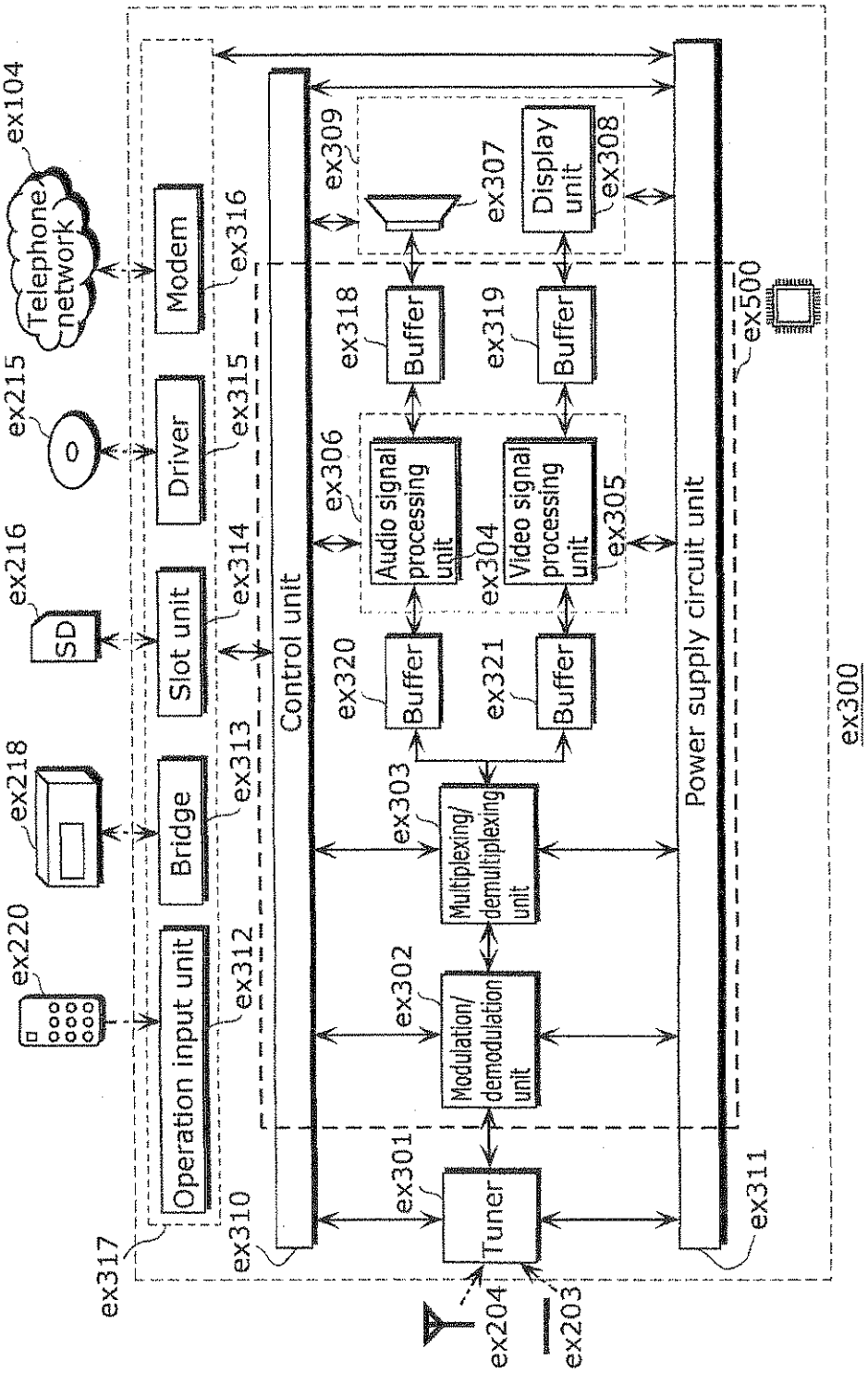

ex104
Telephone network
ex215
ex216
SD
ex218
ex220
ex317
Operation input unit
ex312
Bridge
ex313
Slot unit
ex314
Driver
ex315
Modem
ex316
ex310
Control unit
ex309
ex307
Display unit
ex308
ex318
Buffer
ex319
Buffer
ex306
Audio signal processing unit
ex304
Video signal processing unit
ex305
ex320
Buffer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

FIG. 17

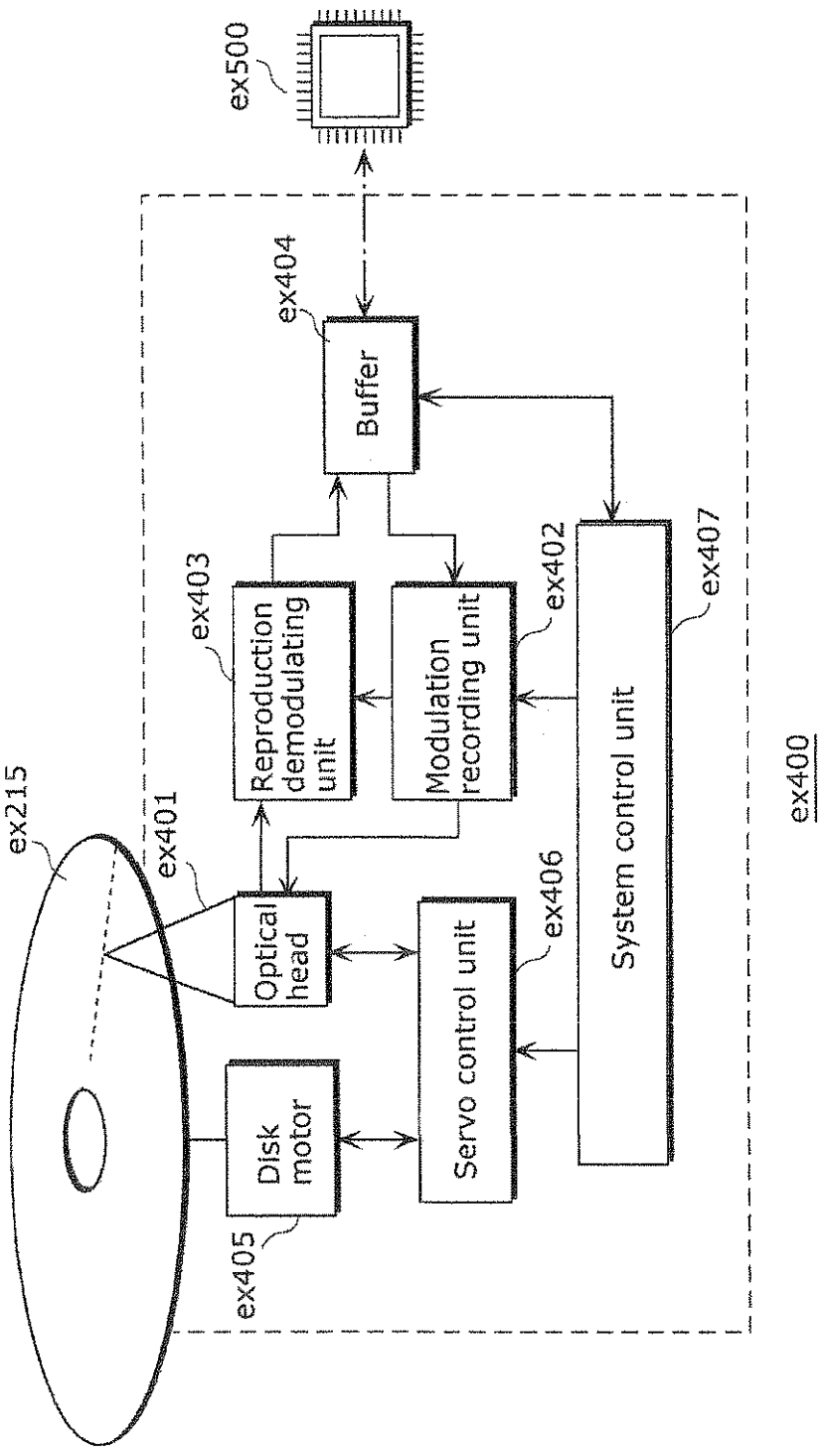

ex500
ex404
Buffer
ex403
Reproduction demodulating unit
Modulation recording unit
ex402
ex407
System control unit
ex400
ex215
ex401
Optical head
ex406
Servo control unit
Disk motor
ex405

FIG. 18

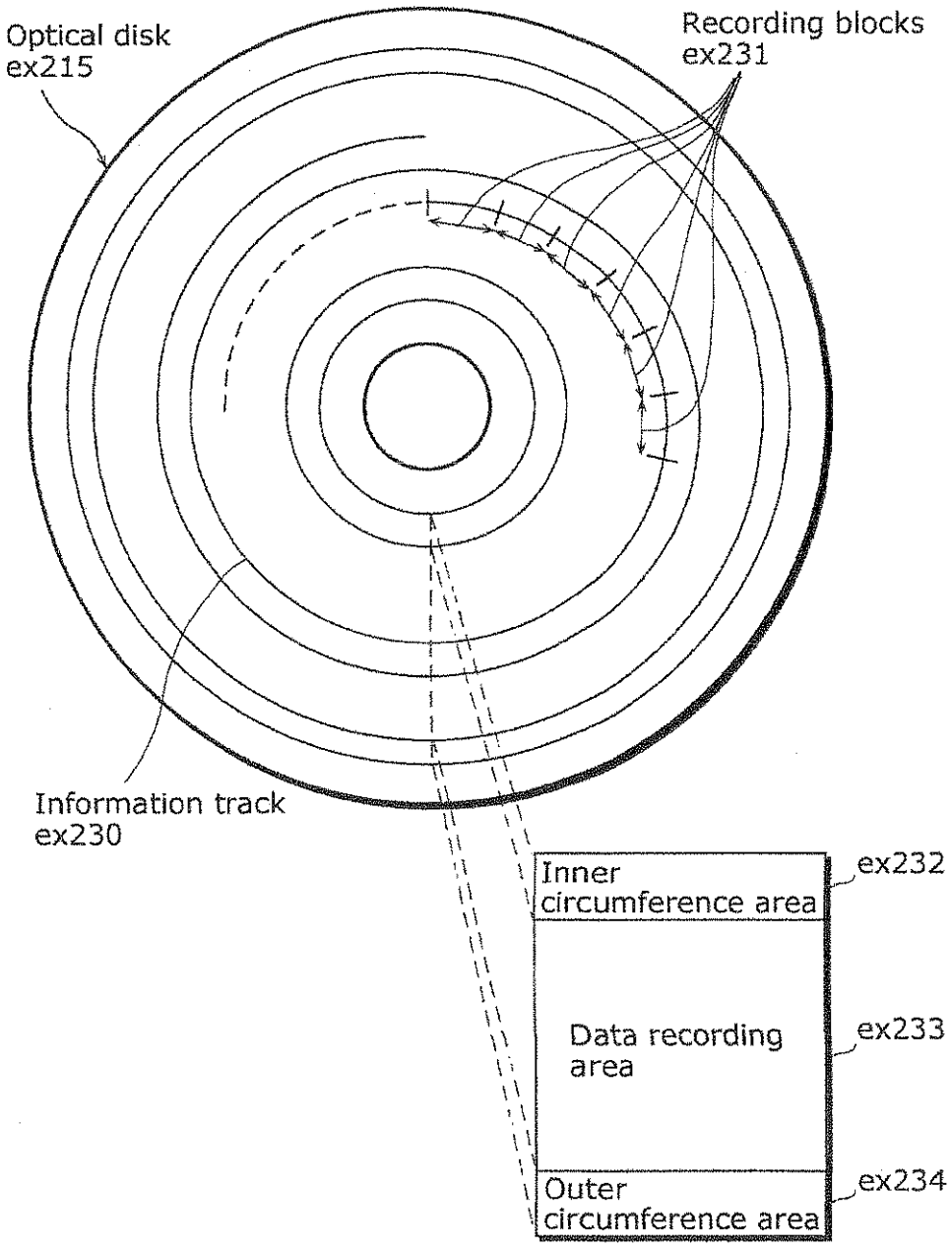

Optical disk
ex215
Recording blocks
ex231
Information track
ex230
Inner
circumference area
ex232
Data recording
area
ex233
Outer
circumference area
ex234

FIG. 19A

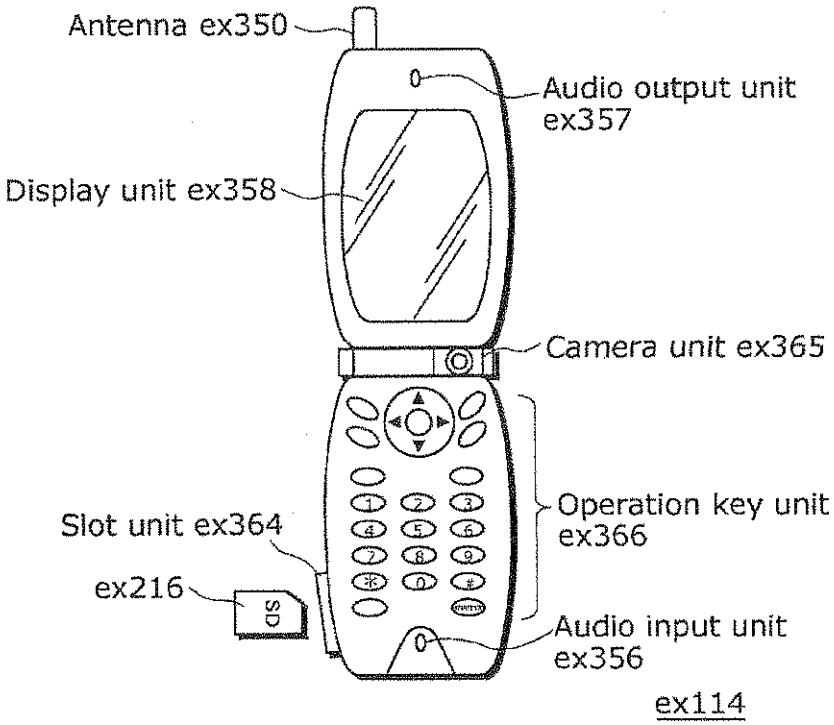


FIG. 19B

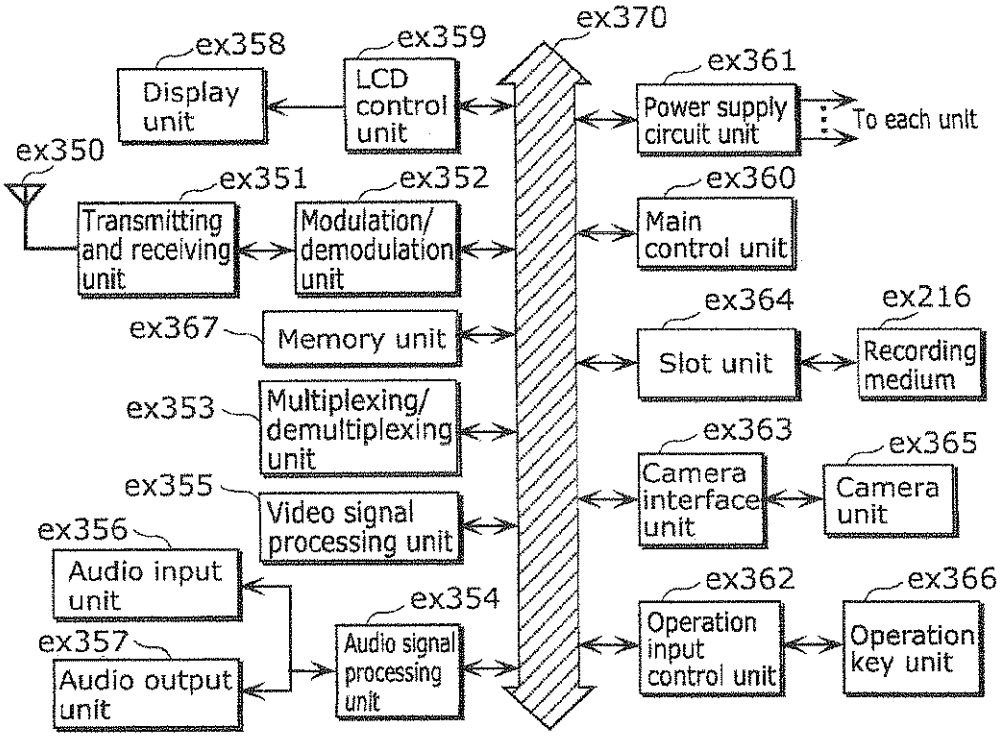


FIG. 20

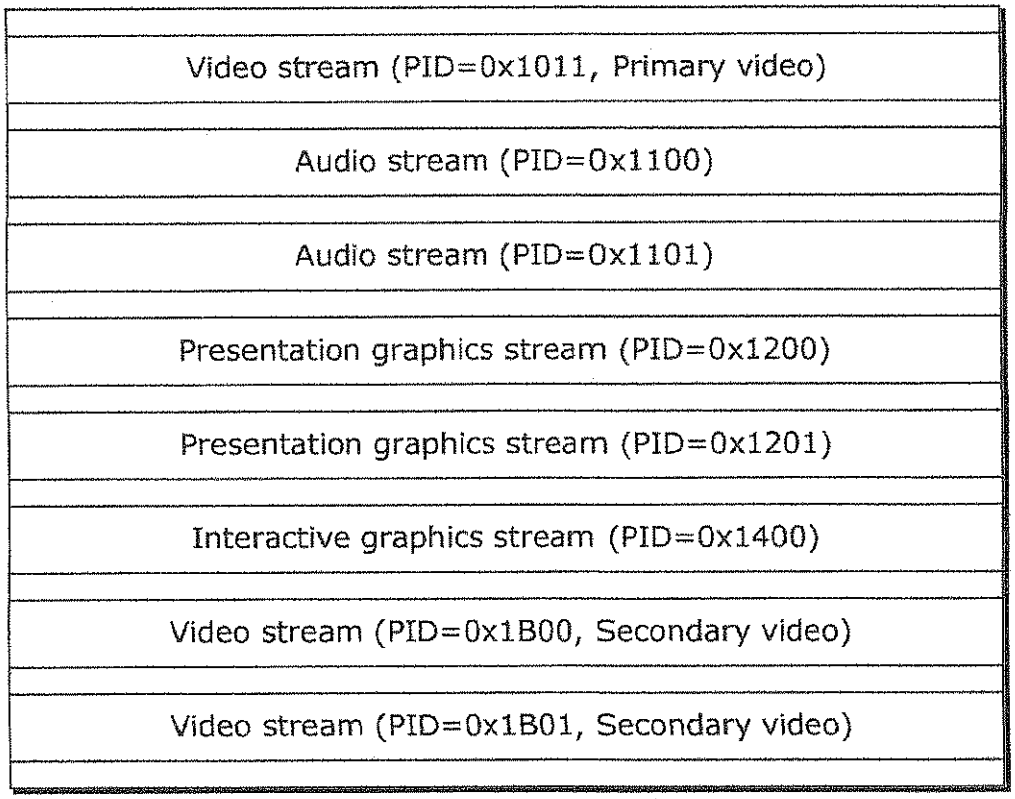

Video stream (PID=0x1011, Primary video)
Audio stream (PID=0x1100)
Audio stream (PID=0x1101)
Presentation graphics stream (PID=0x1200)
Presentation graphics stream (PID=0x1201)
Interactive graphics stream (PID=0x1400)
Video stream (PID=0x1B00, Secondary video)
Video stream (PID=0x1B01, Secondary video)

FIG. 21

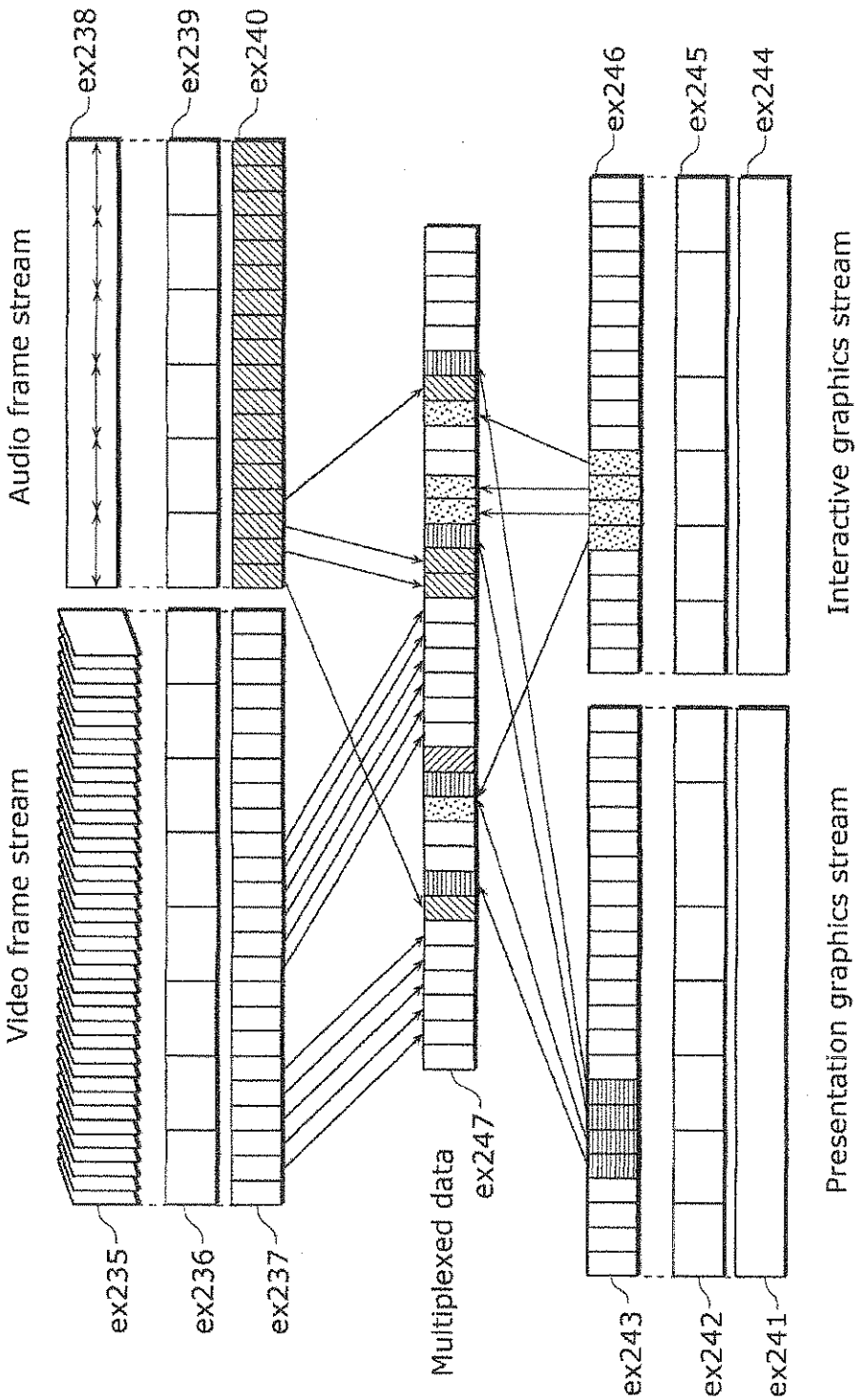

Video frame stream
Audio frame stream
Interactive graphics stream
Presentation graphics stream
Multiplexed data
ex235
ex236
ex237
ex238
ex239
ex240
ex241
ex242
ex243
ex244
ex245
ex246
ex247

FIG. 22

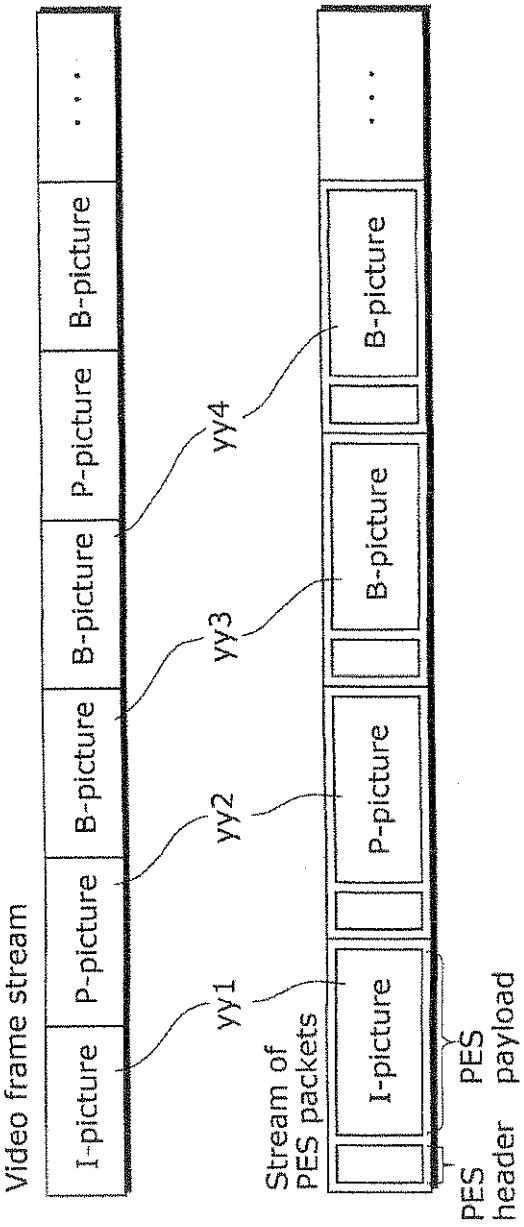

Video frame stream
I-picture
P-picture
B-picture
B-picture
P-picture
B-picture
. . .
yy1
yy2
yy3
yy4
Stream of PES packets
I-picture
P-picture
B-picture
B-picture
. . .
PES header
PES payload

FIG. 23

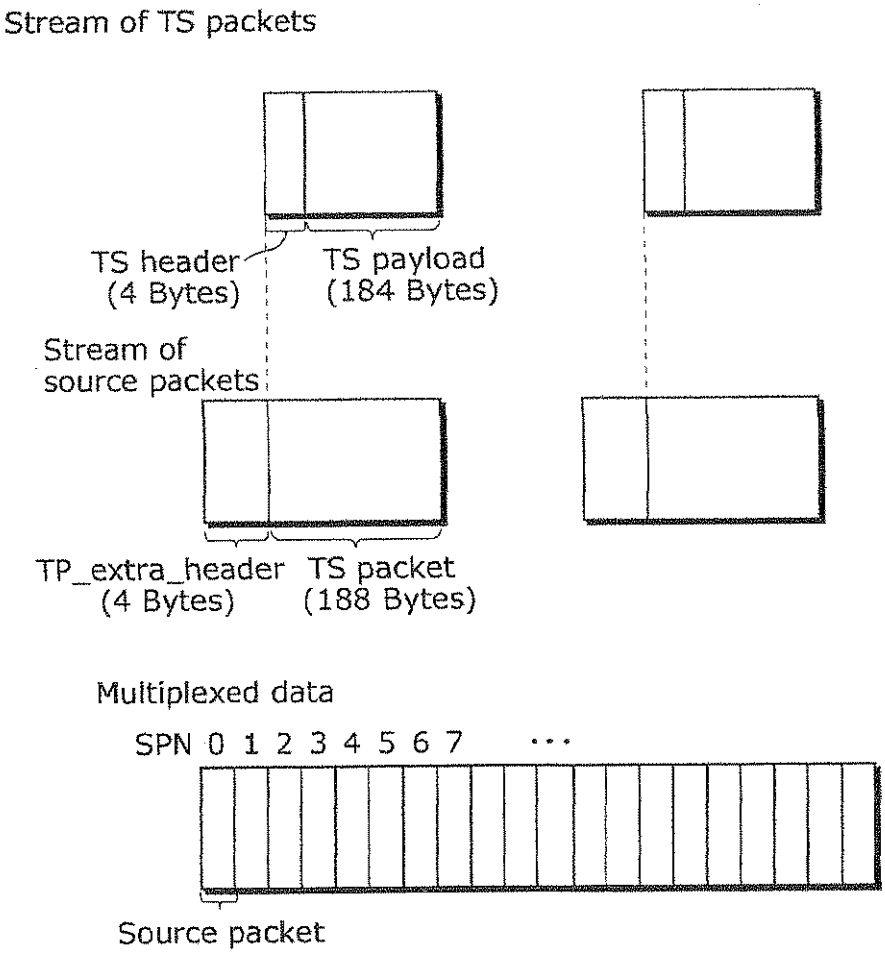

Stream of TS packets
TS header
(4 Bytes)
TS payload
(184 Bytes)
Stream of
source packets
TP_extra_header
(4 Bytes)
TS packet
(188 Bytes)
Multiplexed data
SPN 0 1 2 3 4 5 6 7 ...
Source packet

FIG. 24

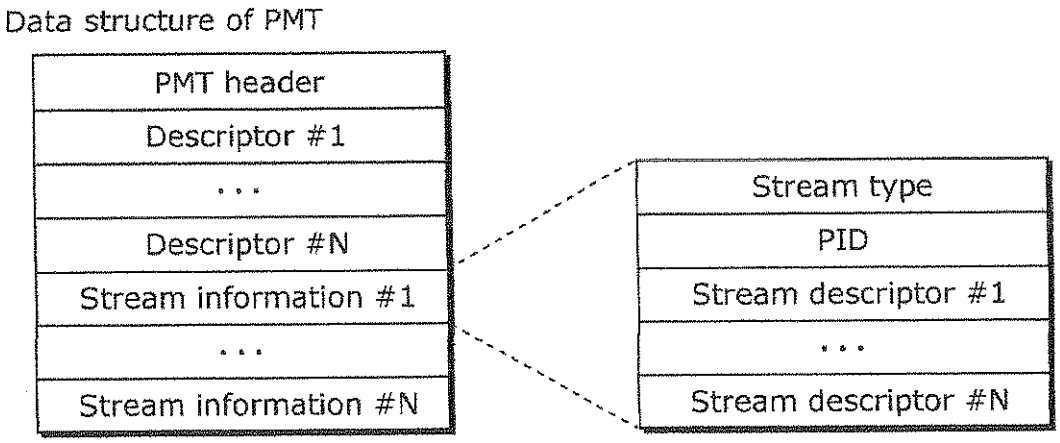

Data structure of PMT
PMT header
Descriptor #1
...
Descriptor #N
Stream information #1
...
Stream information #N
Stream type
PID
Stream descriptor #1
...
Stream descriptor #N

FIG. 25

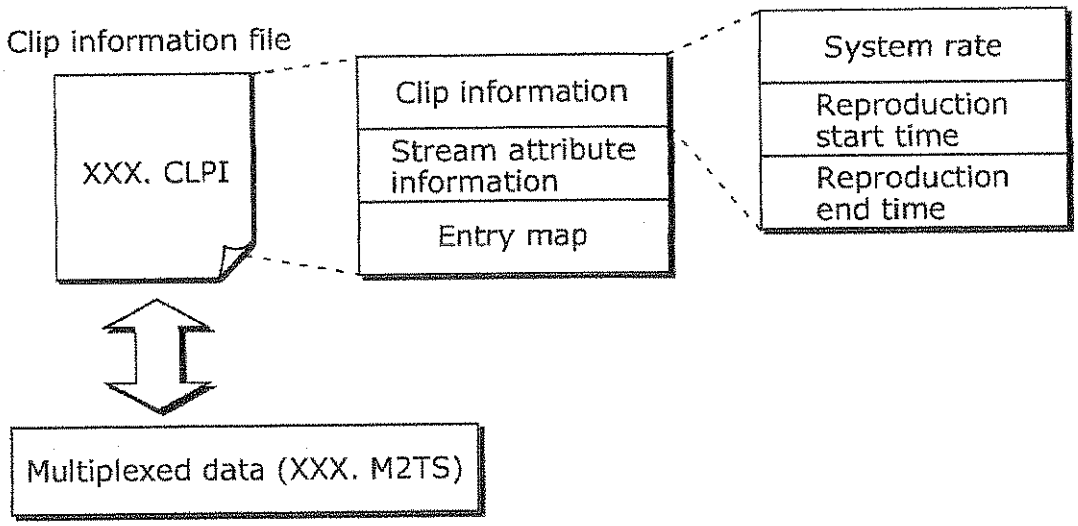

Clip information file
XXX. CLPI
Clip information
Stream attribute information
Entry map
System rate
Reproduction start time
Reproduction end time
Multiplexed data (XXX. M2TS)

FIG. 26

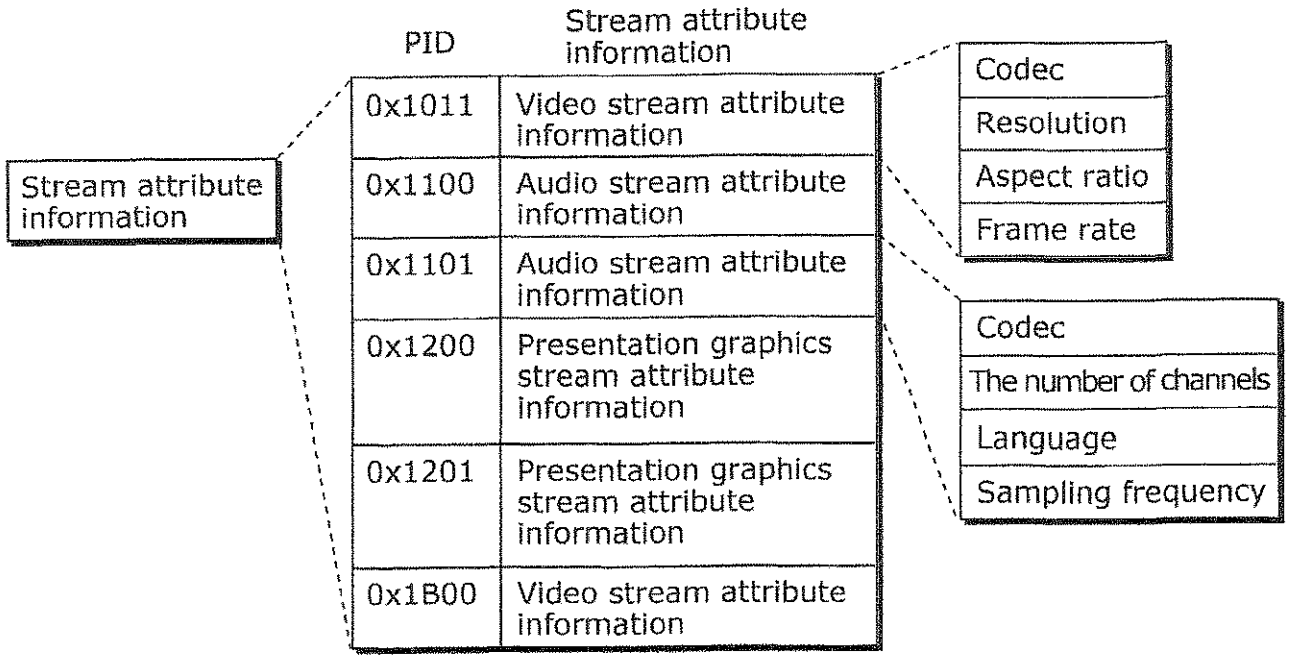

Stream attribute information
PID
Stream attribute information
0x1011
Video stream attribute information
0x1100
Audio stream attribute information
0x1101
Audio stream attribute information
0x1200
Presentation graphics stream attribute information
0x1201
Presentation graphics stream attribute information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

FIG. 27

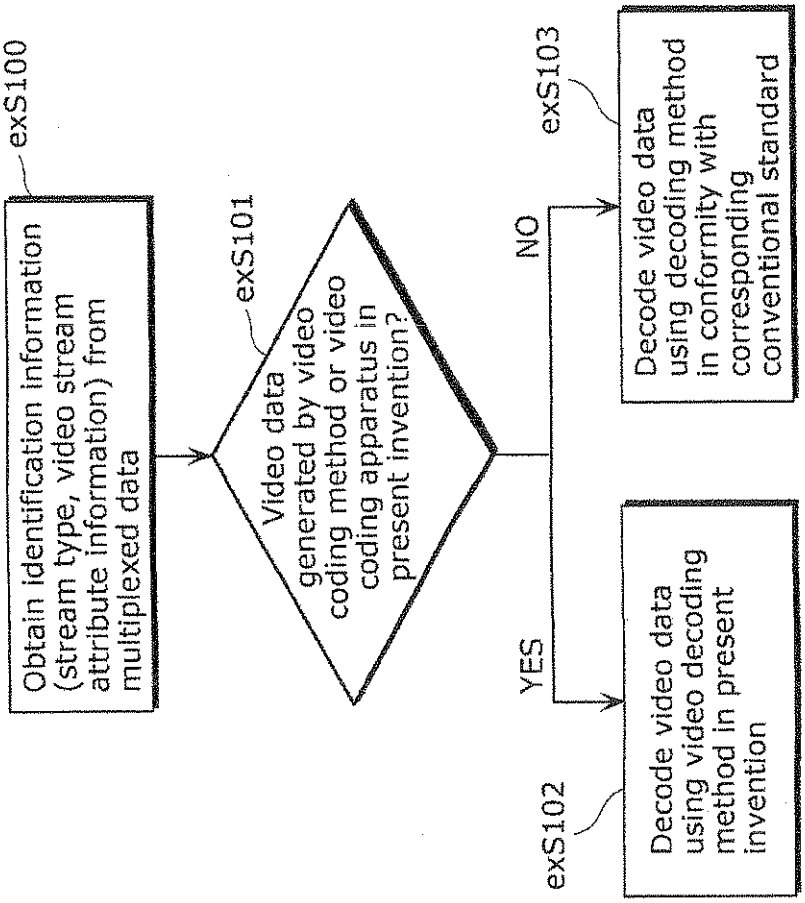

exS100
Obtain identification information (stream type, video stream attribute information) from multiplexed data
exS101
Video data generated by video coding method or video coding apparatus in present invention?
YES
NO
exS102
Decode video data using video decoding method in present invention
exS103
Decode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

FIG. 28

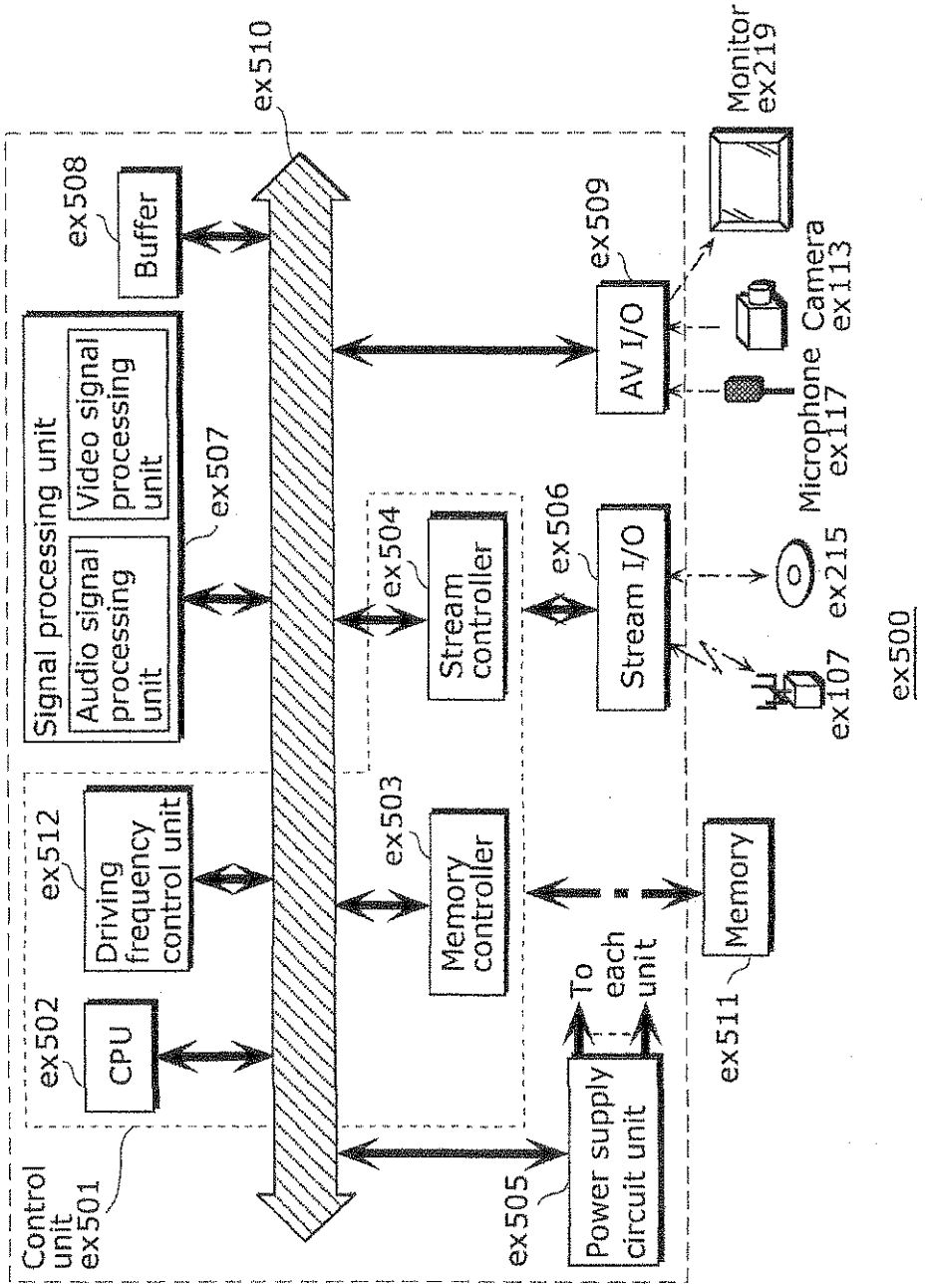

Control unit ex501
CPU ex502
Driving frequency control unit ex512
Signal processing unit
Audio signal processing unit
Video signal processing unit ex507
Buffer ex508
Memory controller ex503
Stream controller ex504
Power supply circuit unit ex505
Stream I/O ex506
AV I/O ex509
Memory ex511
ex510
To each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

FIG. 29

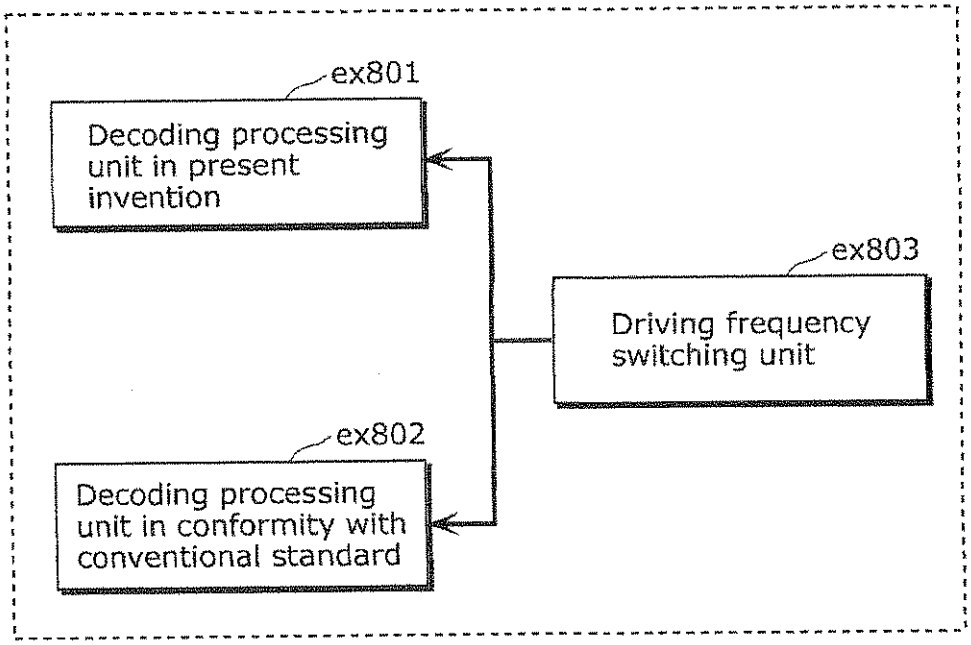

ex801
Decoding processing unit in present invention
ex803
Driving frequency switching unit
ex802
Decoding processing unit in conformity with conventional standard

FIG. 30

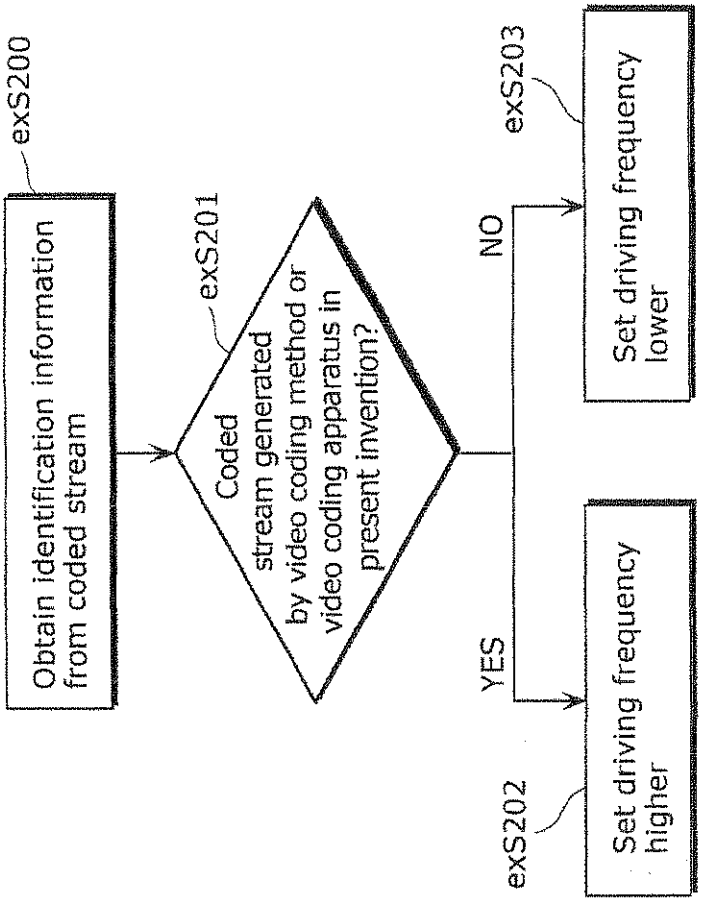

exS200
Obtain identification information from coded stream
exS201
Coded stream generated by video coding method or video coding apparatus in present invention?
YES
NO
exS202
Set driving frequency higher
exS203
Set driving frequency lower

FIG. 31

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

FIG. 32A

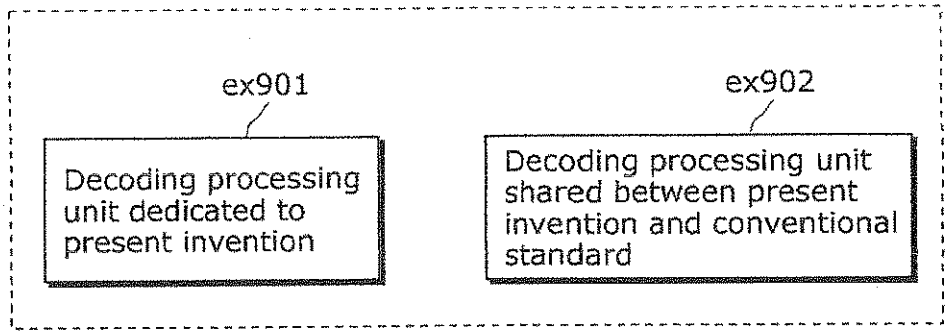


FIG. 32B

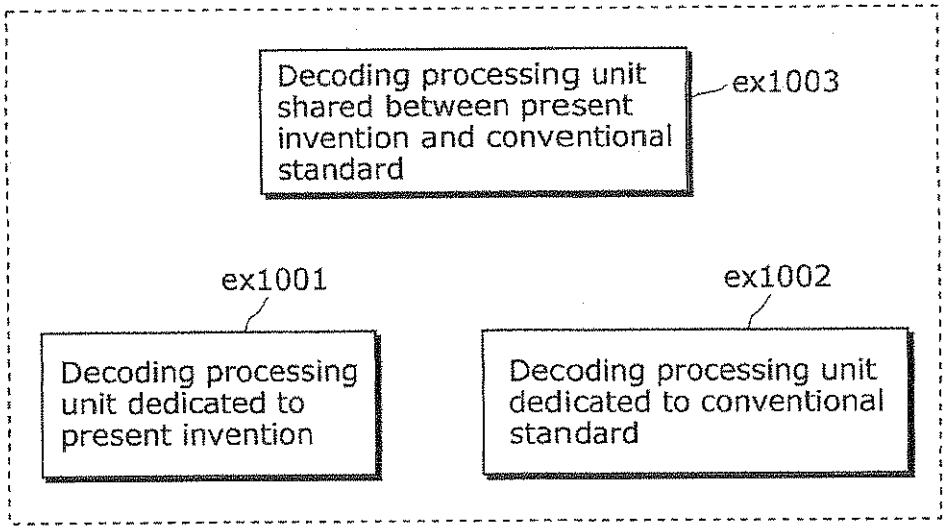
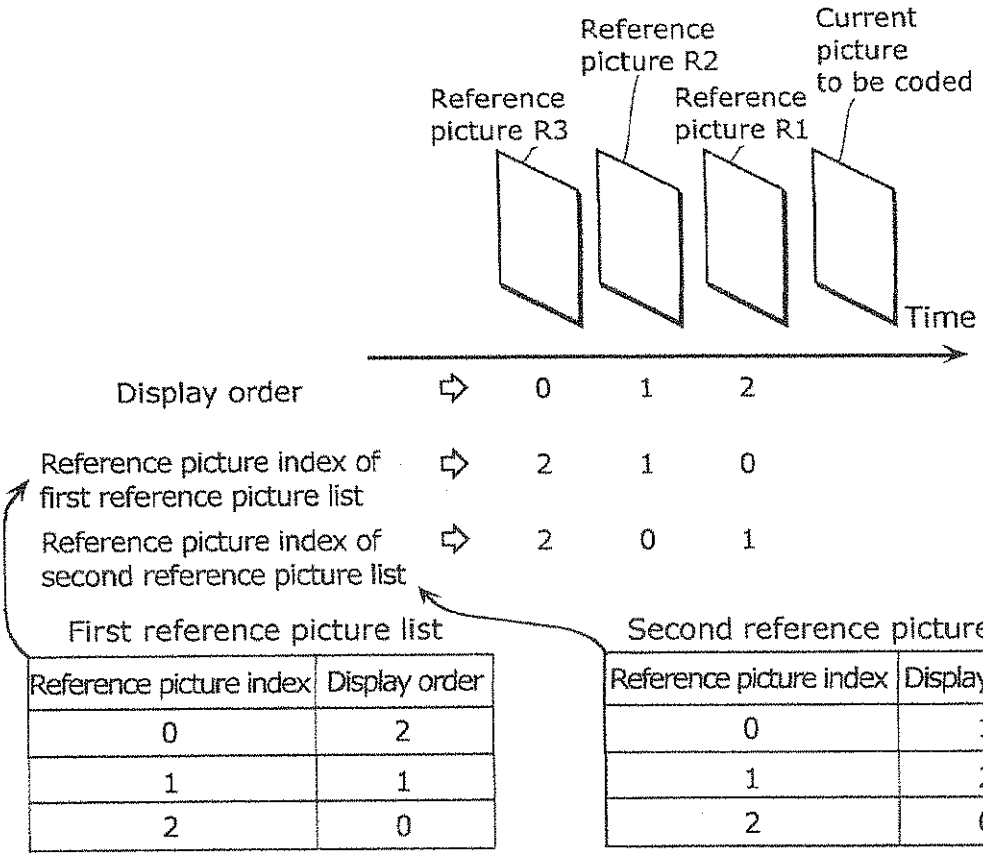


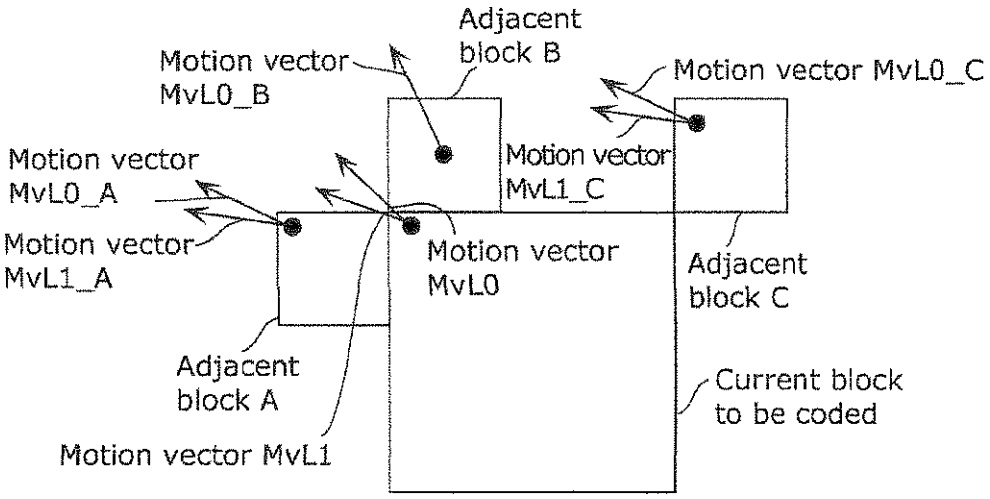
FIG. 33



Reference picture index	Display order
0	2
1	1
2	0

Reference picture index	Display order
0	1
1	2
2	0

FIG. 34


Adjacent
block B
Motion vector
MvL0_B
Motion vector MvL0_C
Motion vector
MvL0_A
Motion vector
MvL1_C
Motion vector
MvL1_A
Motion vector
MvL0
Adjacent
block C
Adjacent
block A
Current block
to be coded
Motion vector MvL1