FIG. 1

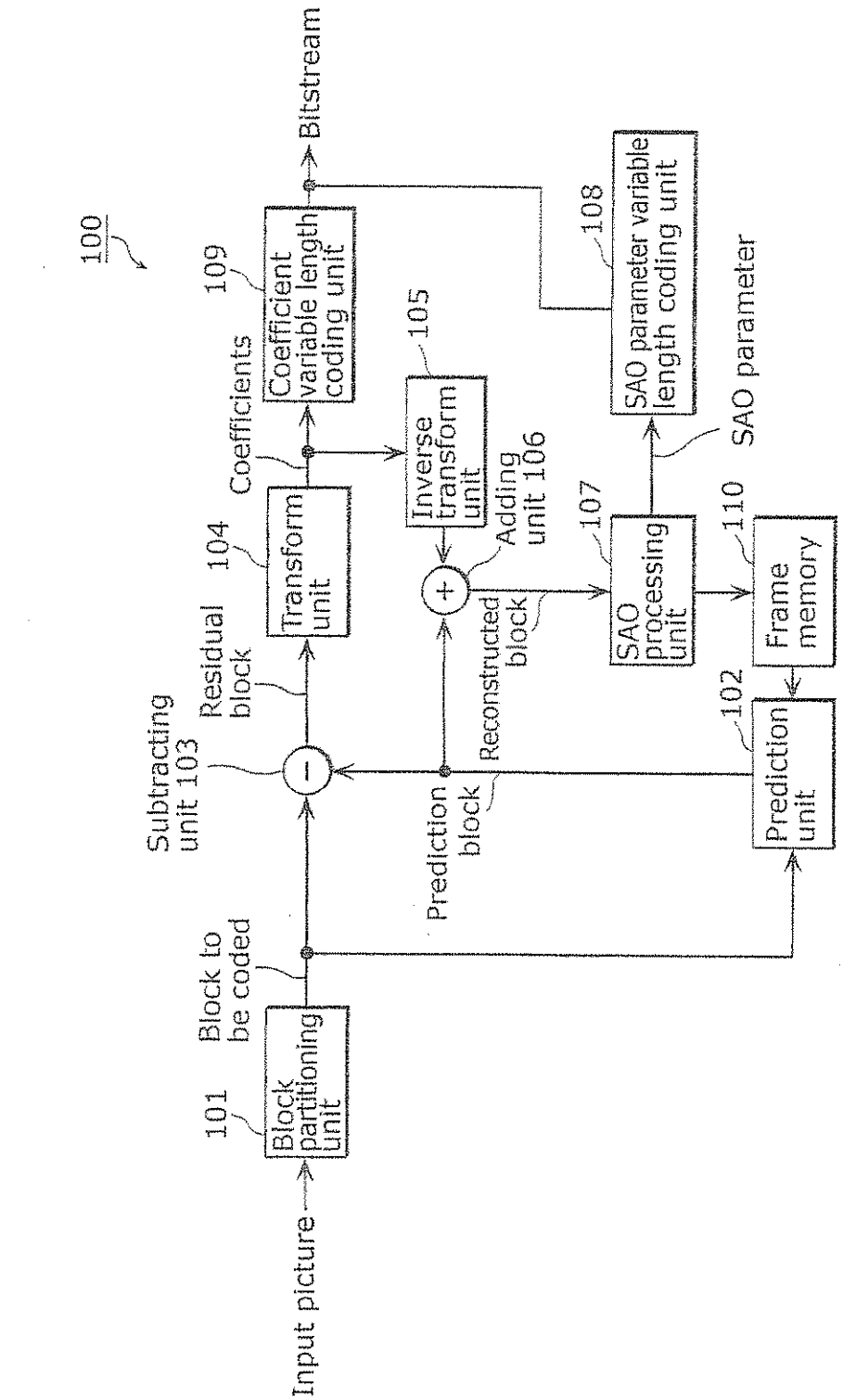

100
Input picture
101
Block partitioning unit
Block to be coded
Subtracting unit 103
Residual block
104
Transform unit
Coefficients
109
Coefficient variable length coding unit
Bitstream
105
Inverse transform unit
Adding unit 106
Reconstructed block
Prediction block
107
SAO processing unit
108
SAO parameter variable length coding unit
SAO parameter
110
Frame memory
102
Prediction unit

FIG. 2

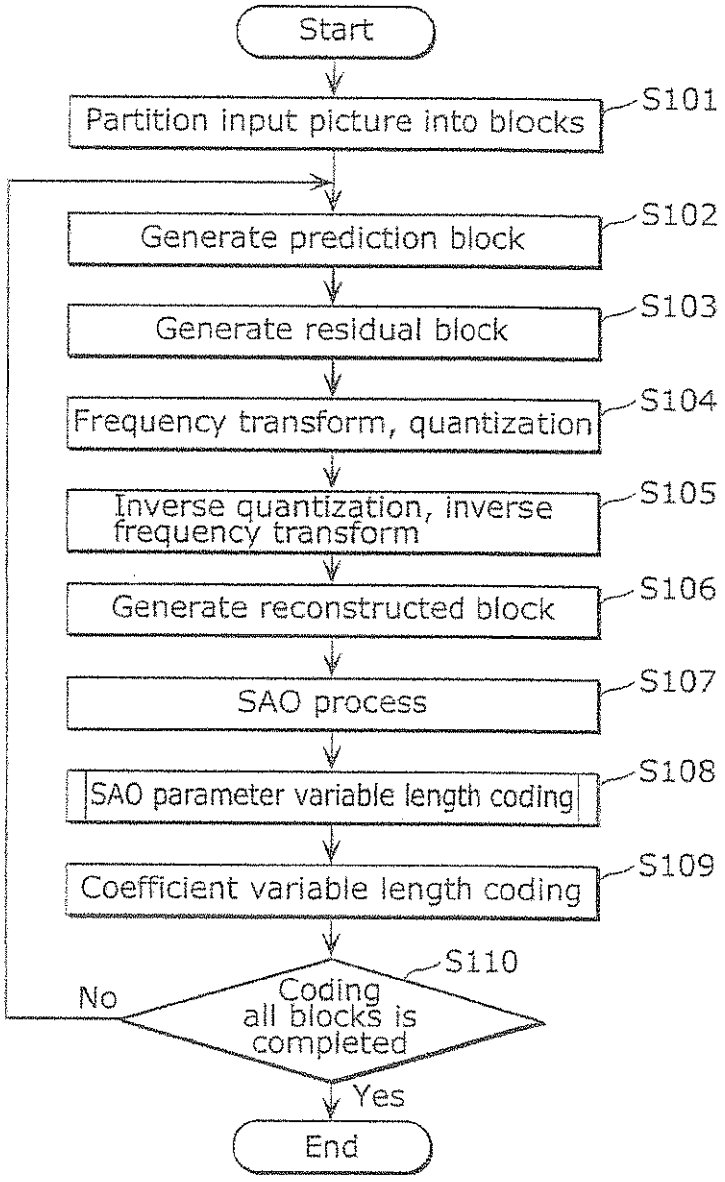

Start
Partition input picture into blocks
S101
Generate prediction block
S102
Generate residual block
S103
Frequency transform, quantization
S104
Inverse quantization, inverse frequency transform
S105
Generate reconstructed block
S106
SAO process
S107
SAO parameter variable length coding
S108
Coefficient variable length coding
S109
Coding all blocks is completed
S110
No
Yes
End

FIG. 3

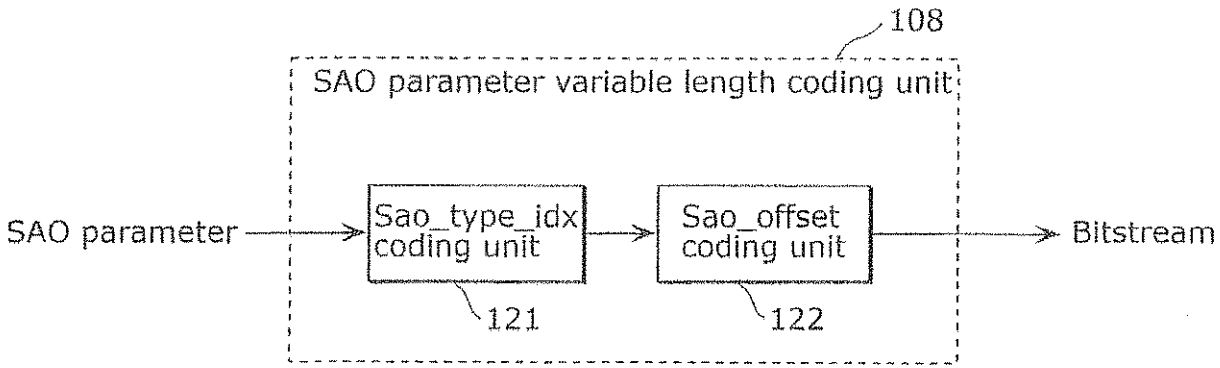

108
SAO parameter variable length coding unit
SAO parameter
Sao_type_idx coding unit
Sao_offset coding unit
Bitstream
121
122

FIG. 4

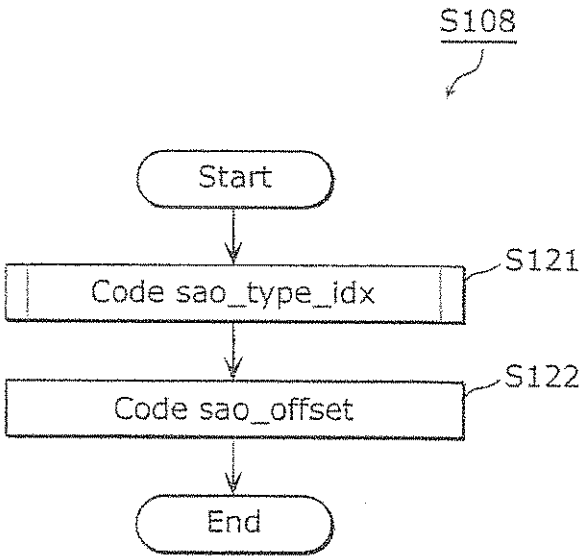


FIG. 5

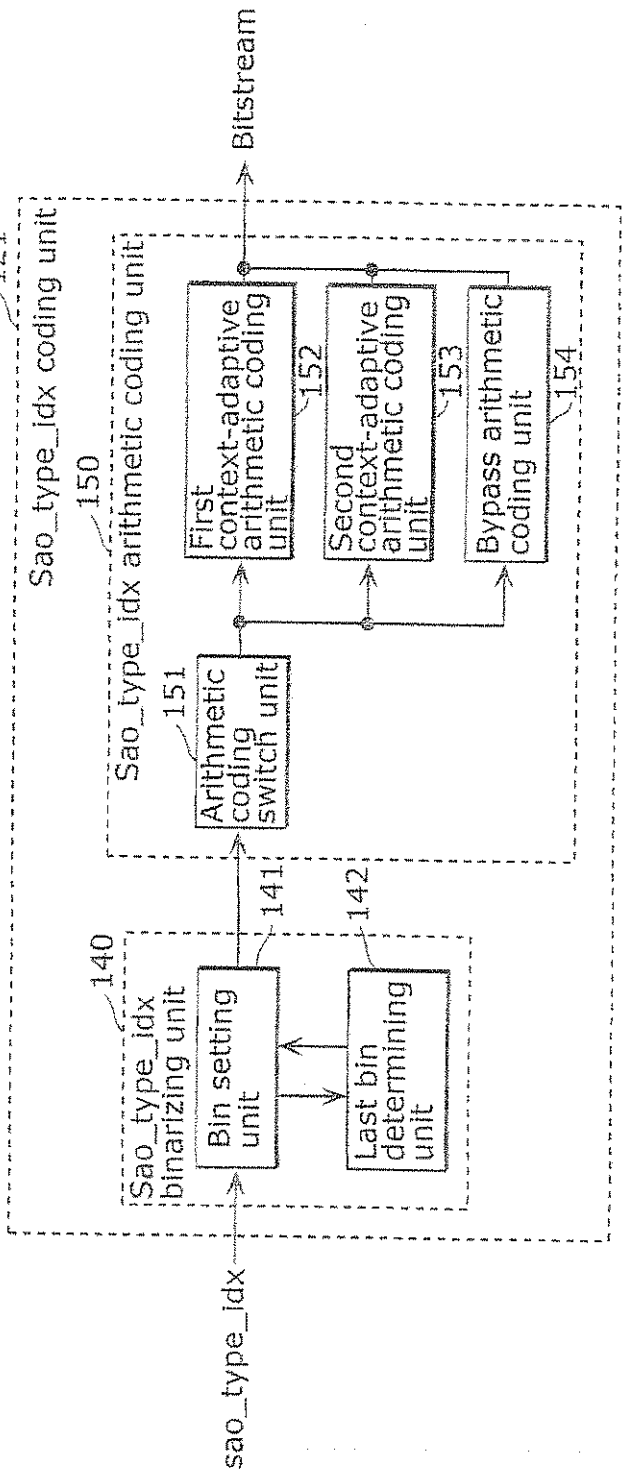

sao_type_idx
121
Sao_type_idx coding unit
140
Sao_type_idx binarizing unit
Bin setting unit
141
Last bin determining unit
142
150
Sao_type_idx arithmetic coding unit
151
Arithmetic coding switch unit
First context-adaptive arithmetic coding unit
152
Second context-adaptive arithmetic coding unit
153
Bypass arithmetic coding unit
154
Bitstream

FIG. 6

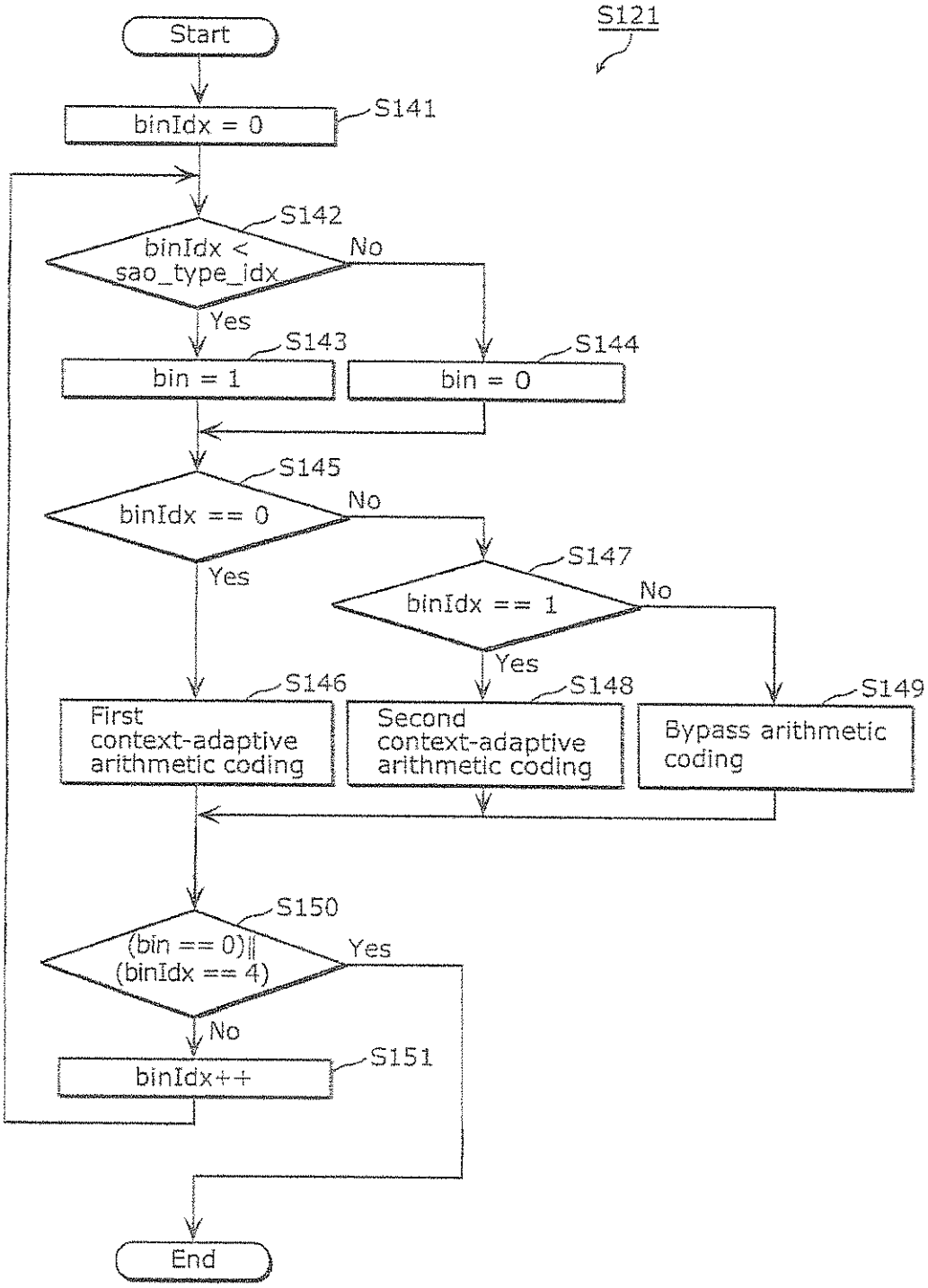

S121
Start
binIdx = 0
S141
S142
binIdx < sao_type_idx
No
Yes
S143
bin = 1
S144
bin = 0
S145
binIdx == 0
No
Yes
S147
binIdx == 1
No
Yes
S146
First context-adaptive arithmetic coding
S148
Second context-adaptive arithmetic coding
S149
Bypass arithmetic coding
S150
(bin == 0)|| (binIdx == 4)
Yes
No
S151
binIdx++
End

FIG. 7

Non-binary signal	Binary signal				
	binIdx				
	0	1	2	3	4
0	0				
1	1	0			
2	1	1	0		
3	1	1	1	0	
4	1	1	1	1	0
5	1	1	1	1	1

FIG. 8

	binIdx				
	0	1	2	3	4
Embodiment 1	Context 0	Context 1	Bypass		
Variation 1	Context 0	Bypass			
Variation 2	Bypass				

FIG. 9

	Main			HE10		
	AI	RA	LB	AI	RA	LB
Embodiment 1	0.00	0.01	0.02	0.00	-0.03	0.04
Variation 1	0.00	-0.04	0.06	0.00	-0.01	-0.01
Variation 2	0.02	0.84	0.85	0.00	0.53	0.67

FIG. 10

Non-binary signal	Binary signal	
	binIdx	
	0	1
0	0	
1	1	0
2	1	1

FIG. 11

	binIdx	
	0	1
Variation 3	Context 0	Bypass

FIG. 12

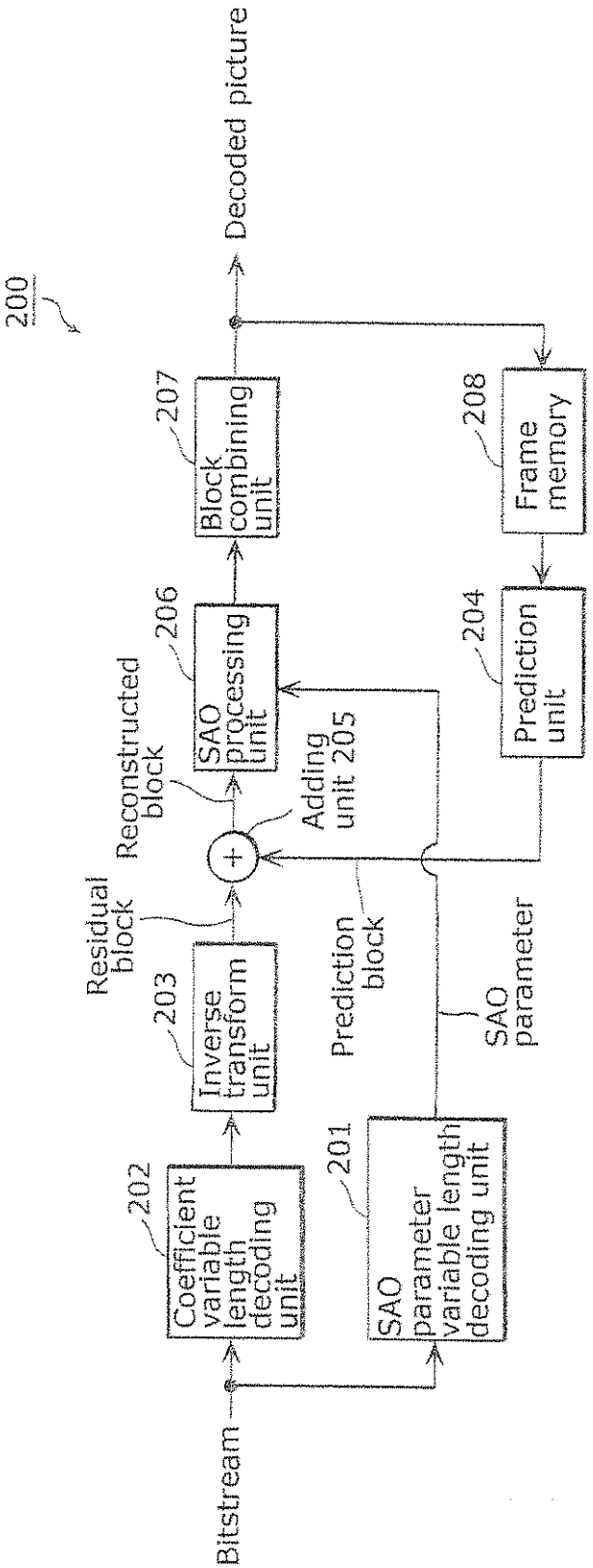

200
Bitstream
Coefficient variable length decoding unit
202
SAO parameter variable length decoding unit
201
Inverse transform unit
203
Residual block
Prediction block
SAO parameter
Adding unit 205
Reconstructed block
SAO processing unit
206
Block combining unit
207
Decoded picture
Prediction unit
204
Frame memory
208

FIG. 13

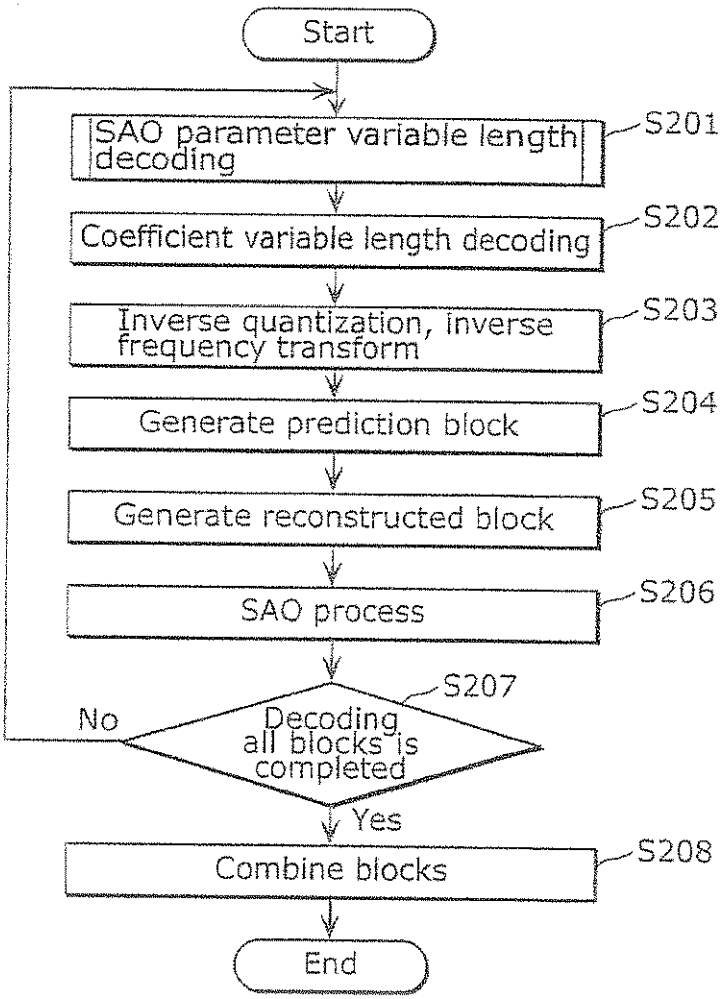

Start
SAO parameter variable length decoding
S201
Coefficient variable length decoding
S202
Inverse quantization, inverse frequency transform
S203
Generate prediction block
S204
Generate reconstructed block
S205
SAO process
S206
Decoding all blocks is completed
S207
No
Yes
Combine blocks
S208
End

FIG. 14

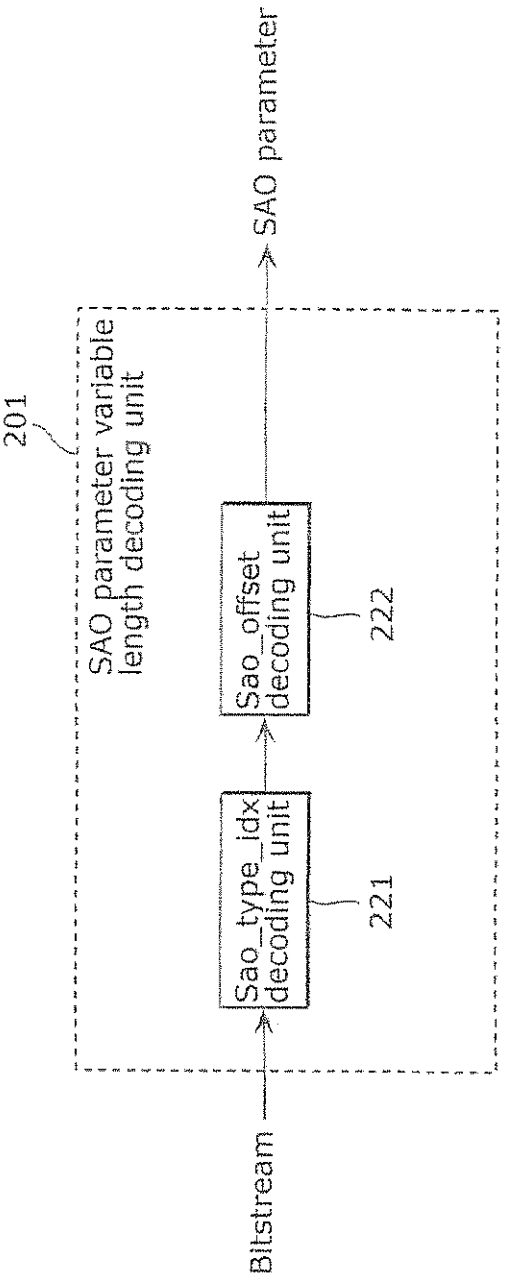

Bitstream
201
SAO parameter variable length decoding unit
Sao_type_idx decoding unit
221
Sao_offset decoding unit
222
SAO parameter

FIG. 15

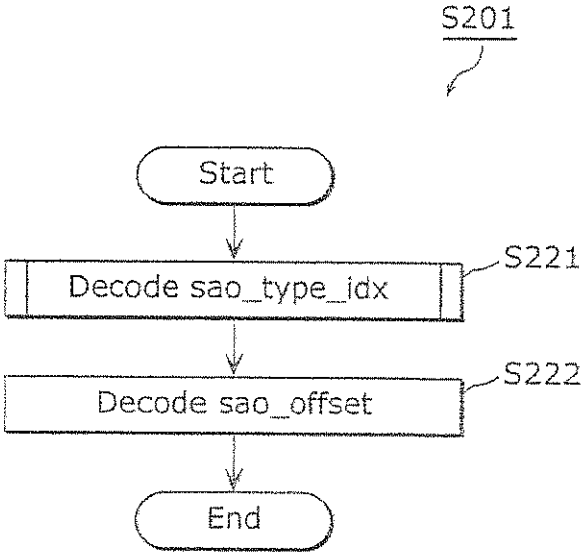

S201
Start
Decode sao_type_idx
S221
Decode sao_offset
S222
End

FIG. 16

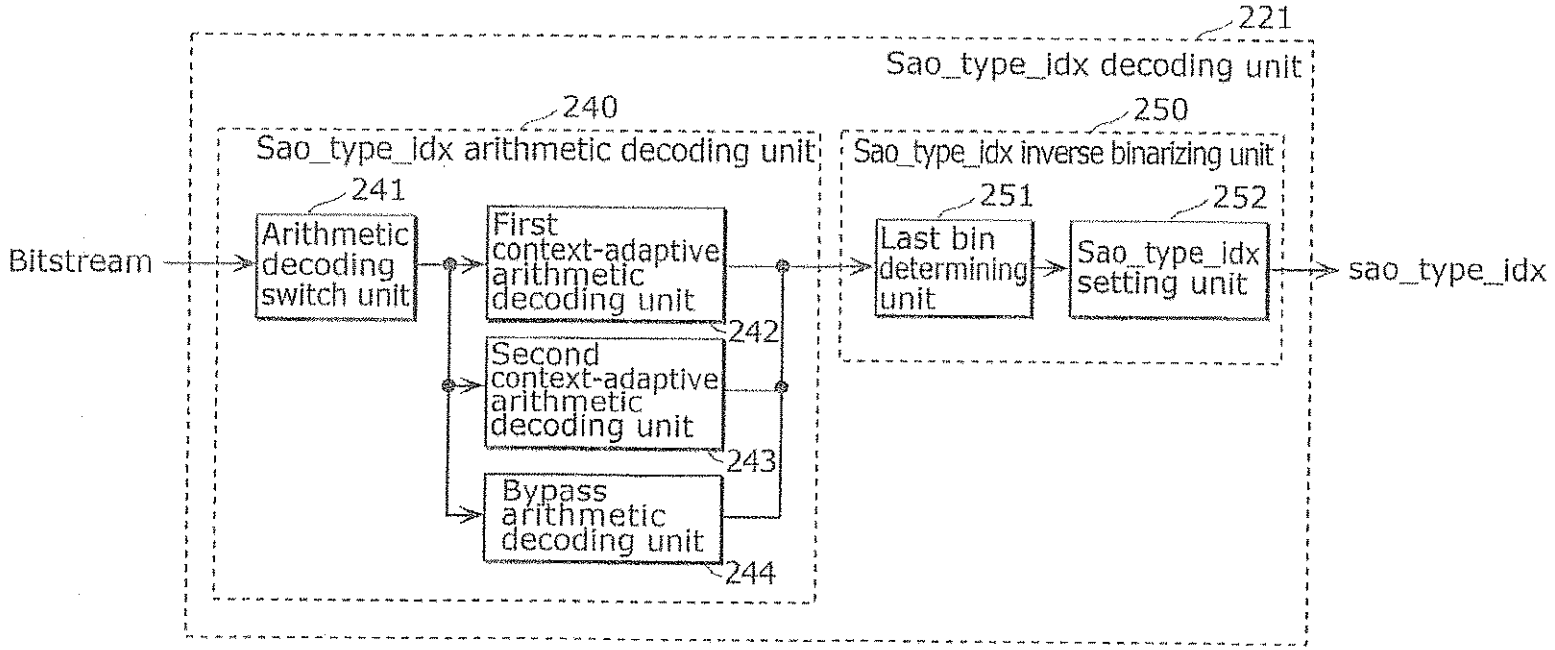

221
Sao_type_idx decoding unit
240
Sao_type_idx arithmetic decoding unit
250
Sao_type_idx inverse binarizing unit
241
Arithmetic decoding switch unit
First context-adaptive arithmetic decoding unit
242
Second context-adaptive arithmetic decoding unit
243
Bypass arithmetic decoding unit
244
251
Last bin determining unit
252
Sao_type_idx setting unit
Bitstream
sao_type_idx

FIG. 17

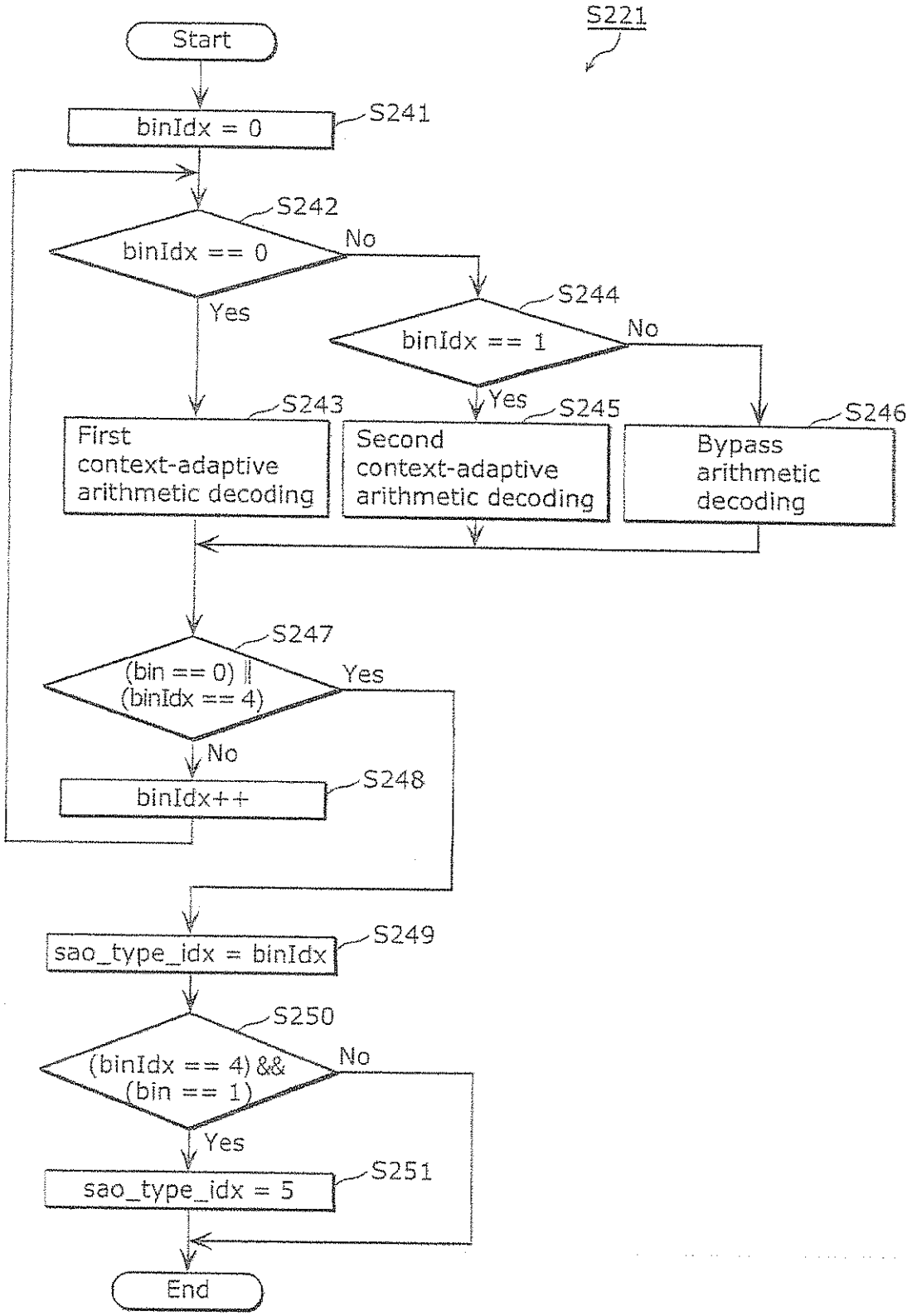

S221
Start
binIdx = 0
S241
S242
binIdx == 0
No
Yes
S244
binIdx == 1
No
Yes
S243
First context-adaptive arithmetic decoding
S245
Second context-adaptive arithmetic decoding
S246
Bypass arithmetic decoding
S247
(bin == 0) || (binIdx == 4)
Yes
No
binIdx++
S248
sao_type_idx = binIdx
S249
S250
(binIdx == 4) && (bin == 1)
No
Yes
sao_type_idx = 5
S251
End

FIG. 18A

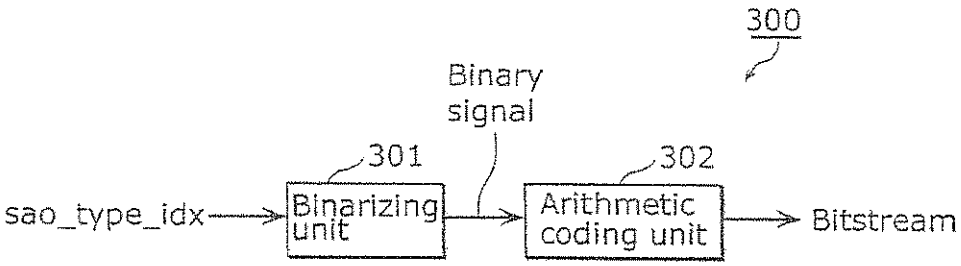


FIG. 18B

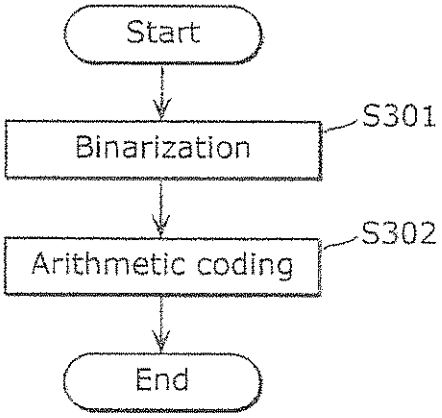


FIG. 19A

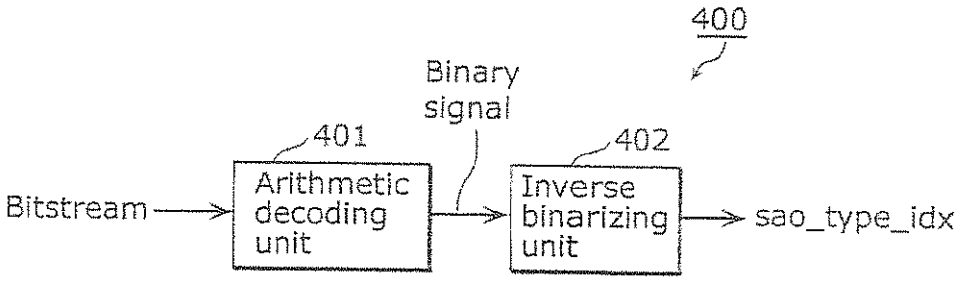


FIG. 19B

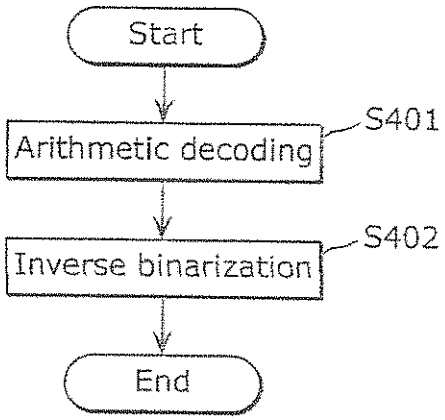


FIG. 20

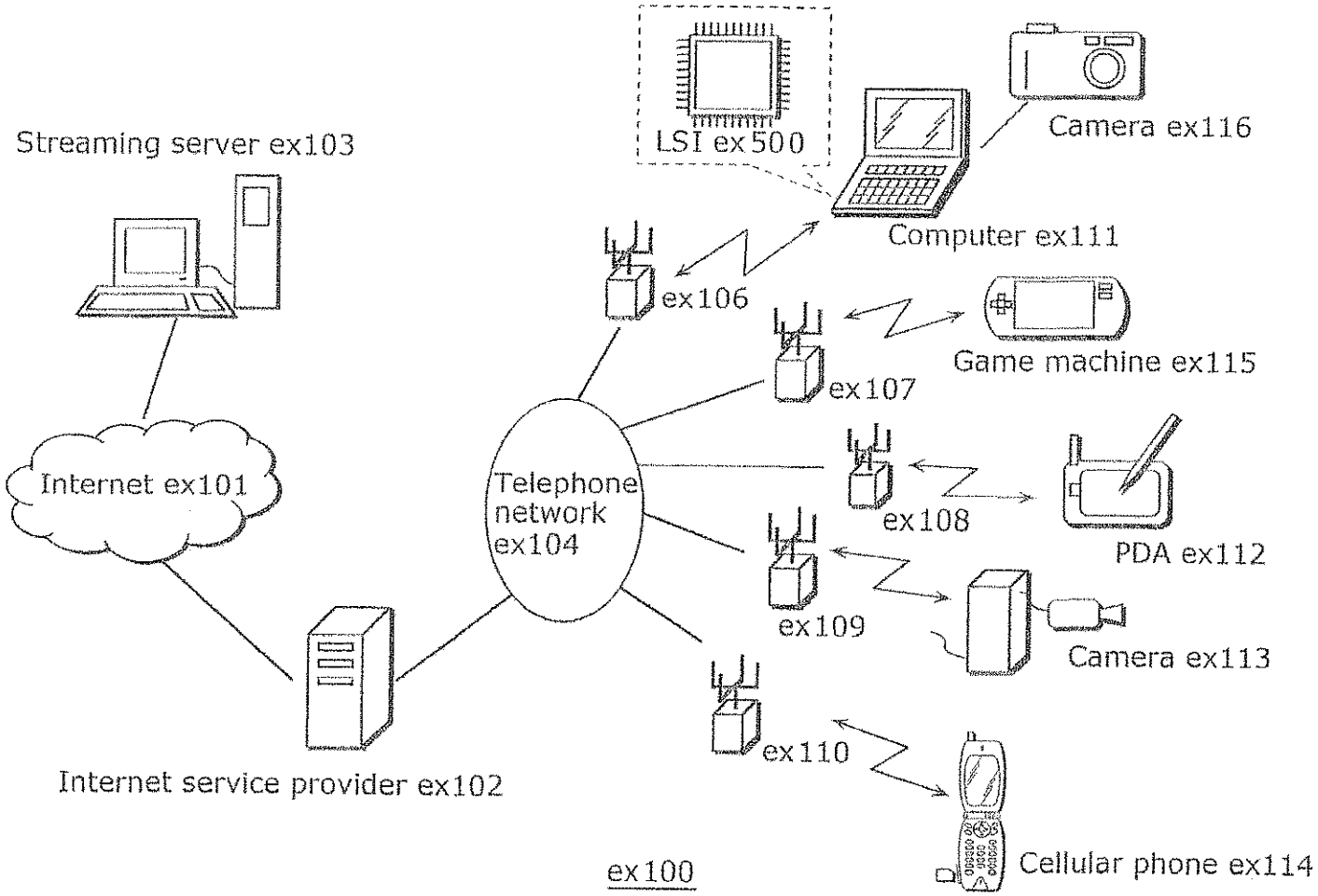

LSI ex500
Camera ex116
Streaming server ex103
Computer ex111
ex106
ex107
Game machine ex115
Internet ex101
Telephone network ex104
ex108
PDA ex112
ex109
Camera ex113
ex110
Internet service provider ex102
ex100
Cellular phone ex114

FIG. 21

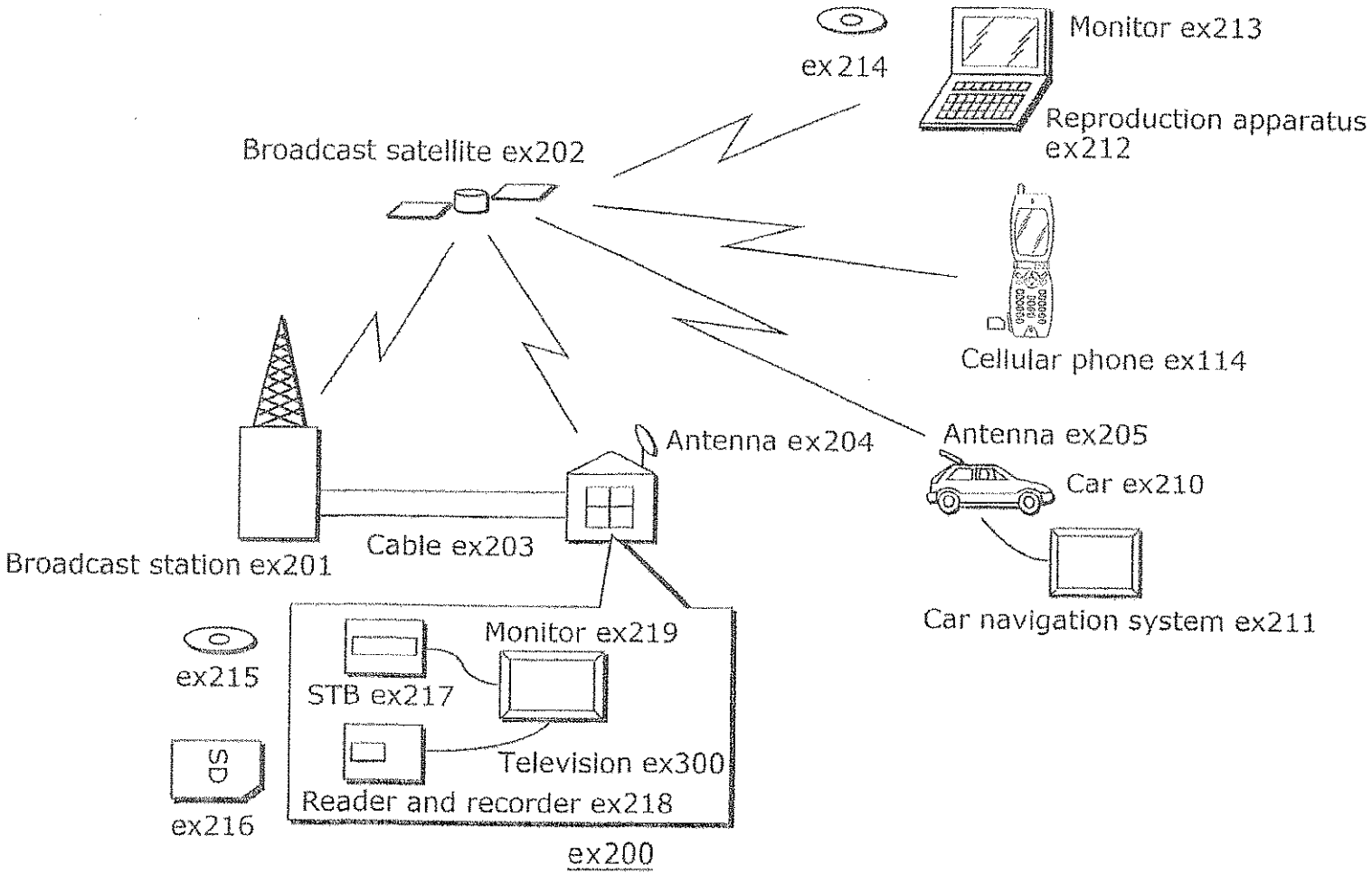

ex214
Monitor ex213
Reproduction apparatus ex212
Broadcast satellite ex202
Cellular phone ex114
Antenna ex204
Antenna ex205
Car ex210
Broadcast station ex201
Cable ex203
Car navigation system ex211
Monitor ex219
ex215
STB ex217
SD
Television ex300
Reader and recorder ex218
ex216
ex200

FIG. 22

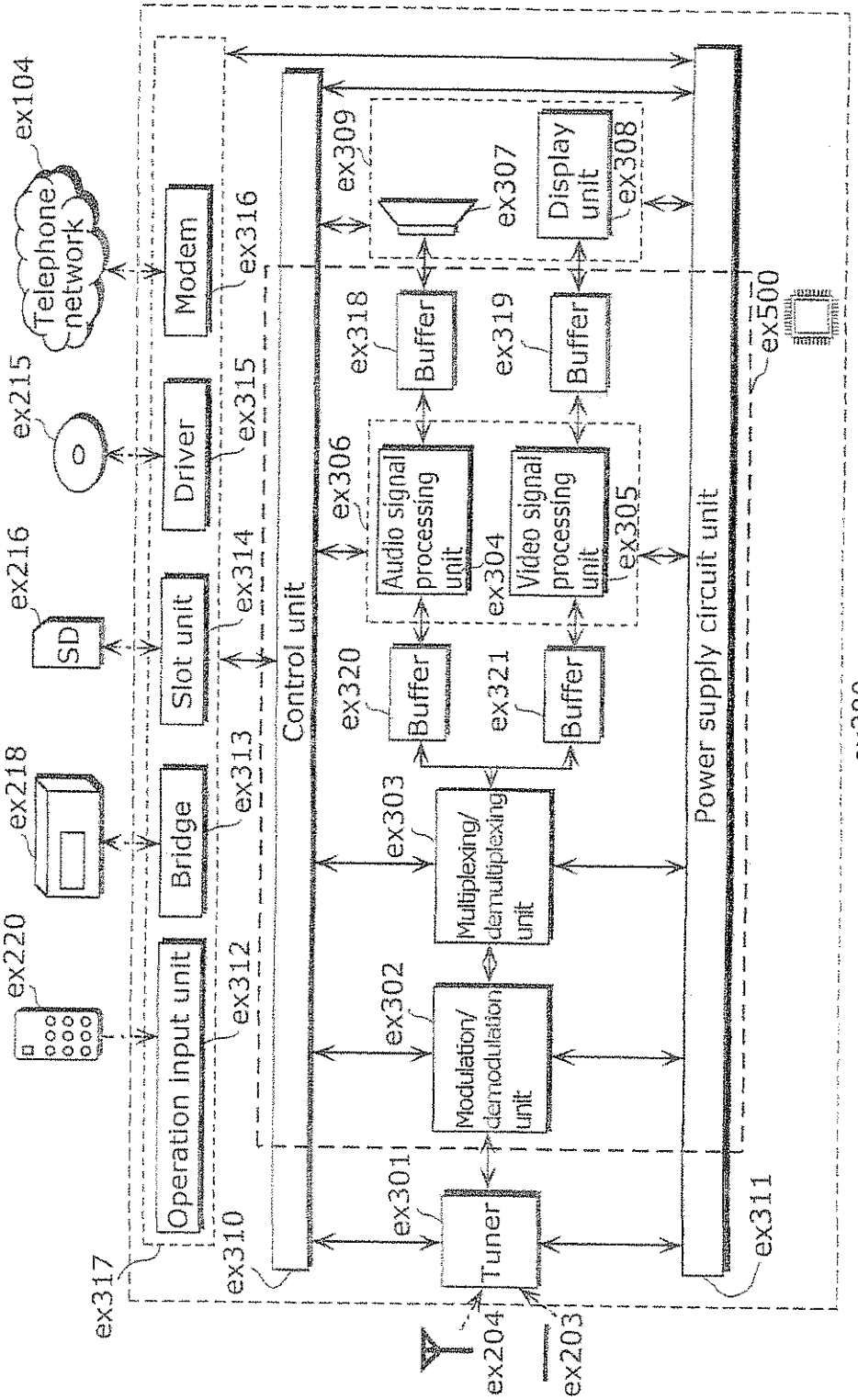

ex104
Telephone network
ex215
ex216
SD
ex218
ex220
ex317
ex204
ex203
ex310
Operation input unit
Bridge
Slot unit
Driver
Modem
ex312
ex313
ex314
ex315
ex316
Control unit
ex309
ex307
Display unit
ex308
ex318
Buffer
ex319
Buffer
ex306
Audio signal processing unit
ex304
Video signal processing unit
ex305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

FIG. 23

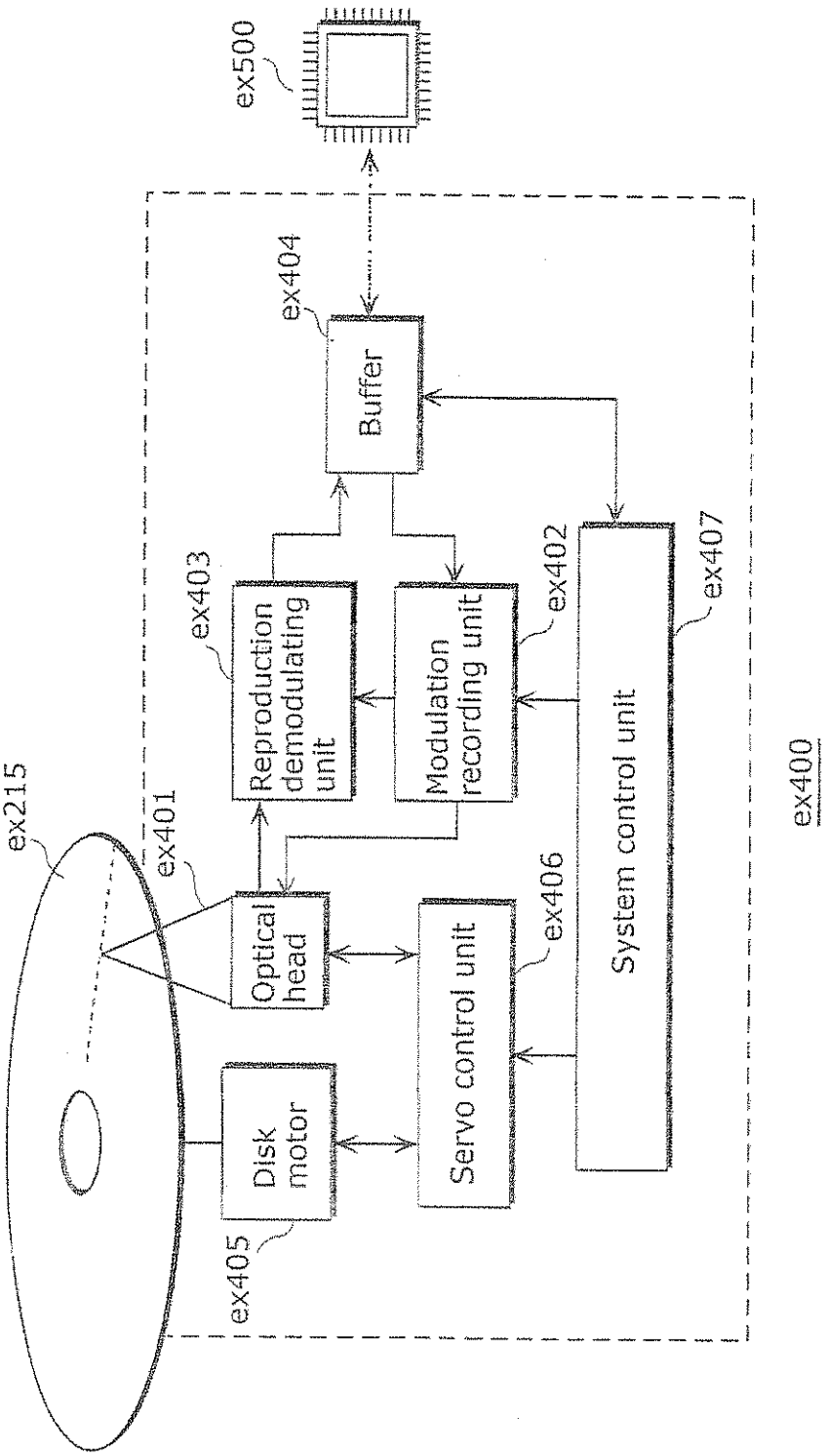

ex500
ex404
Buffer
ex403
Reproduction demodulating unit
ex402
Modulation recording unit
ex407
System control unit
ex400
ex215
ex401
Optical head
ex406
Servo control unit
Disk motor
ex405

FIG. 24

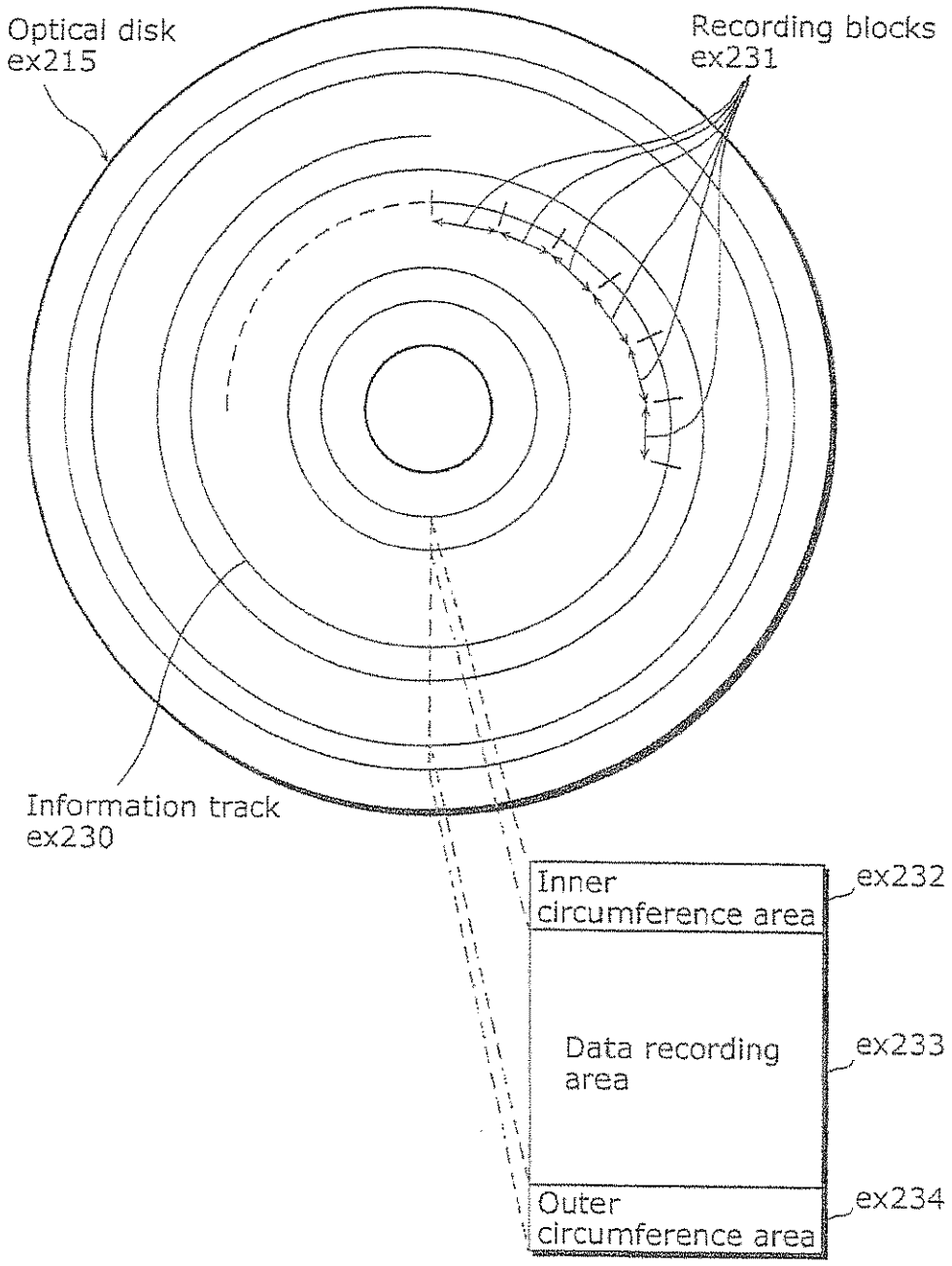

Optical disk
ex215
Recording blocks
ex231
Information track
ex230
Inner
circumference area
ex232
Data recording
area
ex233
Outer
circumference area
ex234

FIG. 25A

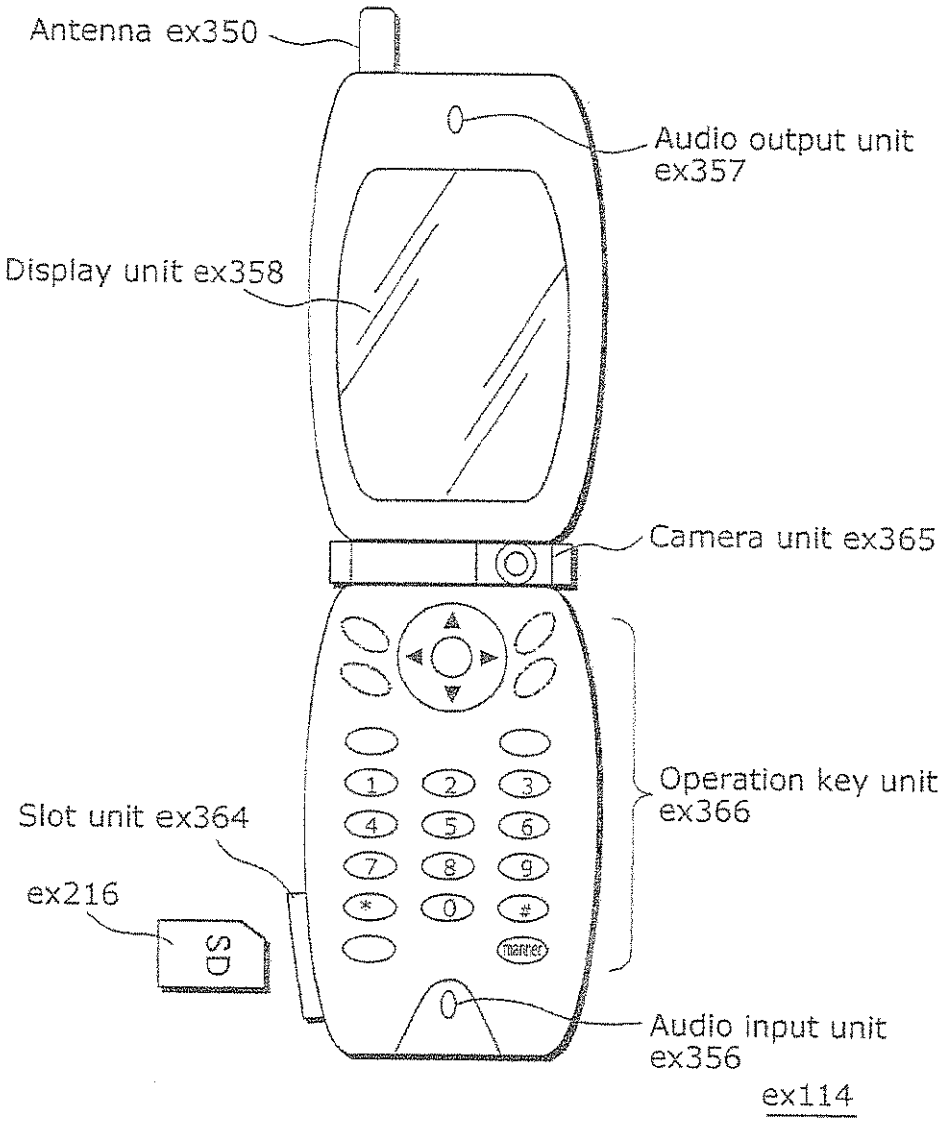

Antenna ex350
Audio output unit ex357
Display unit ex358
Camera unit ex365
Operation key unit ex366
Slot unit ex364
ex216
SD
Audio input unit ex356
ex114

FIG. 25B

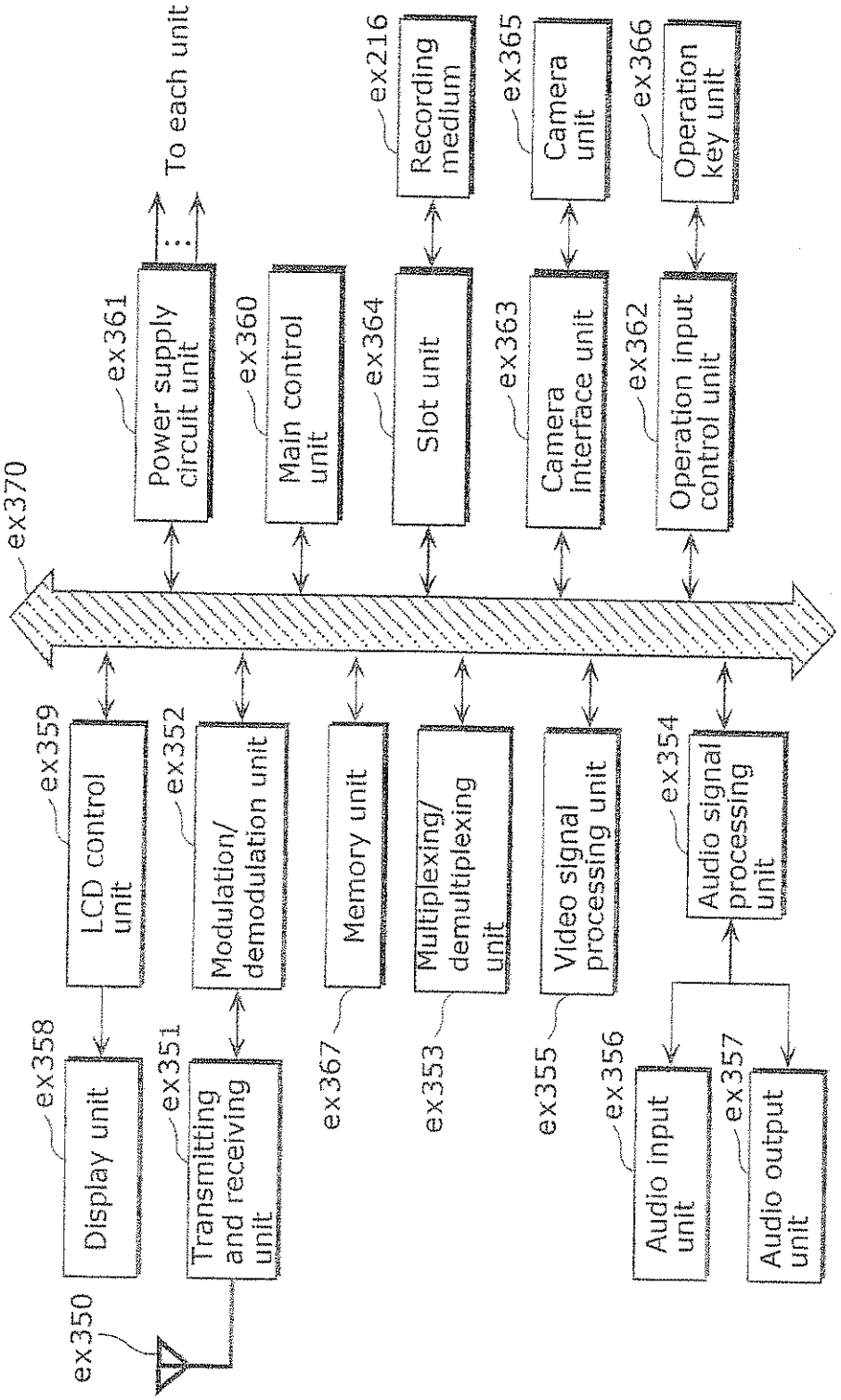

ex370
ex361
Power supply circuit unit
To each unit
ex360
Main control unit
ex364
Slot unit
ex216
Recording medium
ex363
Camera interface unit
ex365
Camera unit
ex362
Operation input control unit
ex366
Operation key unit
ex359
LCD control unit
ex352
Modulation/ demodulation unit
Memory unit
ex367
Multiplexing/ demultiplexing unit
ex353
Video signal processing unit
ex355
ex354
Audio signal processing unit
ex358
Display unit
ex351
Transmitting and receiving unit
ex350
ex356
Audio input unit
ex357
Audio output unit

FIG. 26

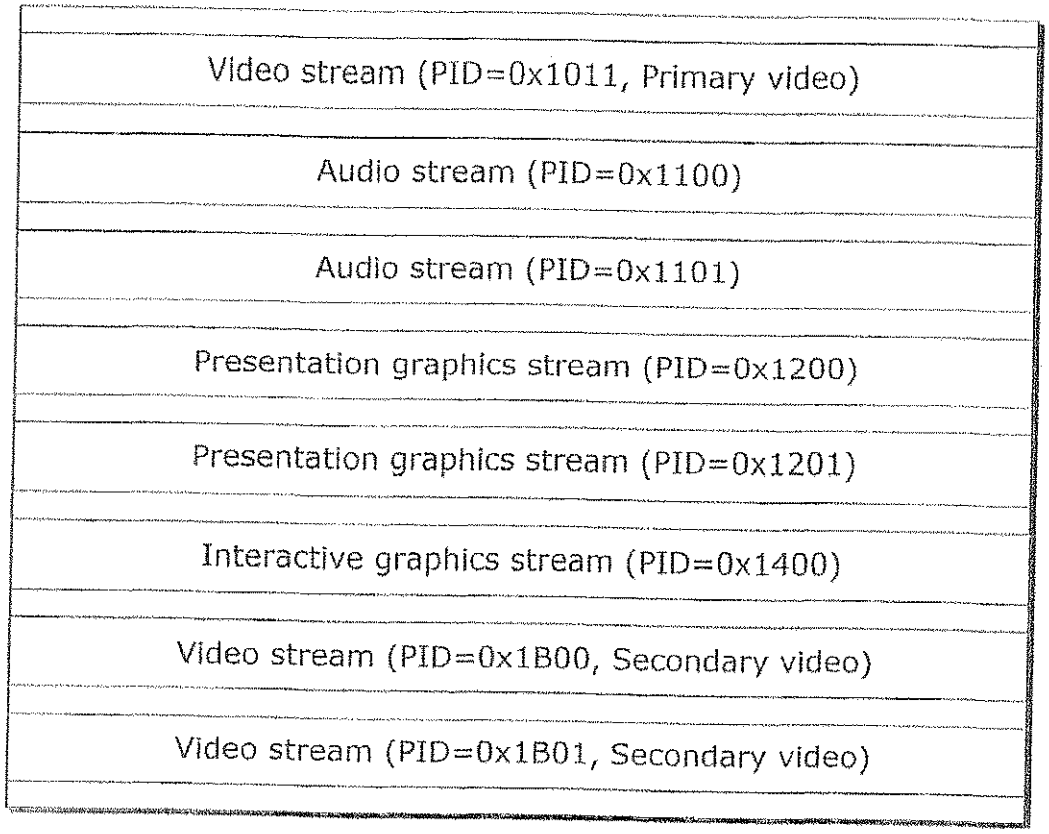

Video stream (PID=0x1011, Primary video)
Audio stream (PID=0x1100)
Audio stream (PID=0x1101)
Presentation graphics stream (PID=0x1200)
Presentation graphics stream (PID=0x1201)
Interactive graphics stream (PID=0x1400)
Video stream (PID=0x1B00, Secondary video)
Video stream (PID=0x1B01, Secondary video)

FIG. 27

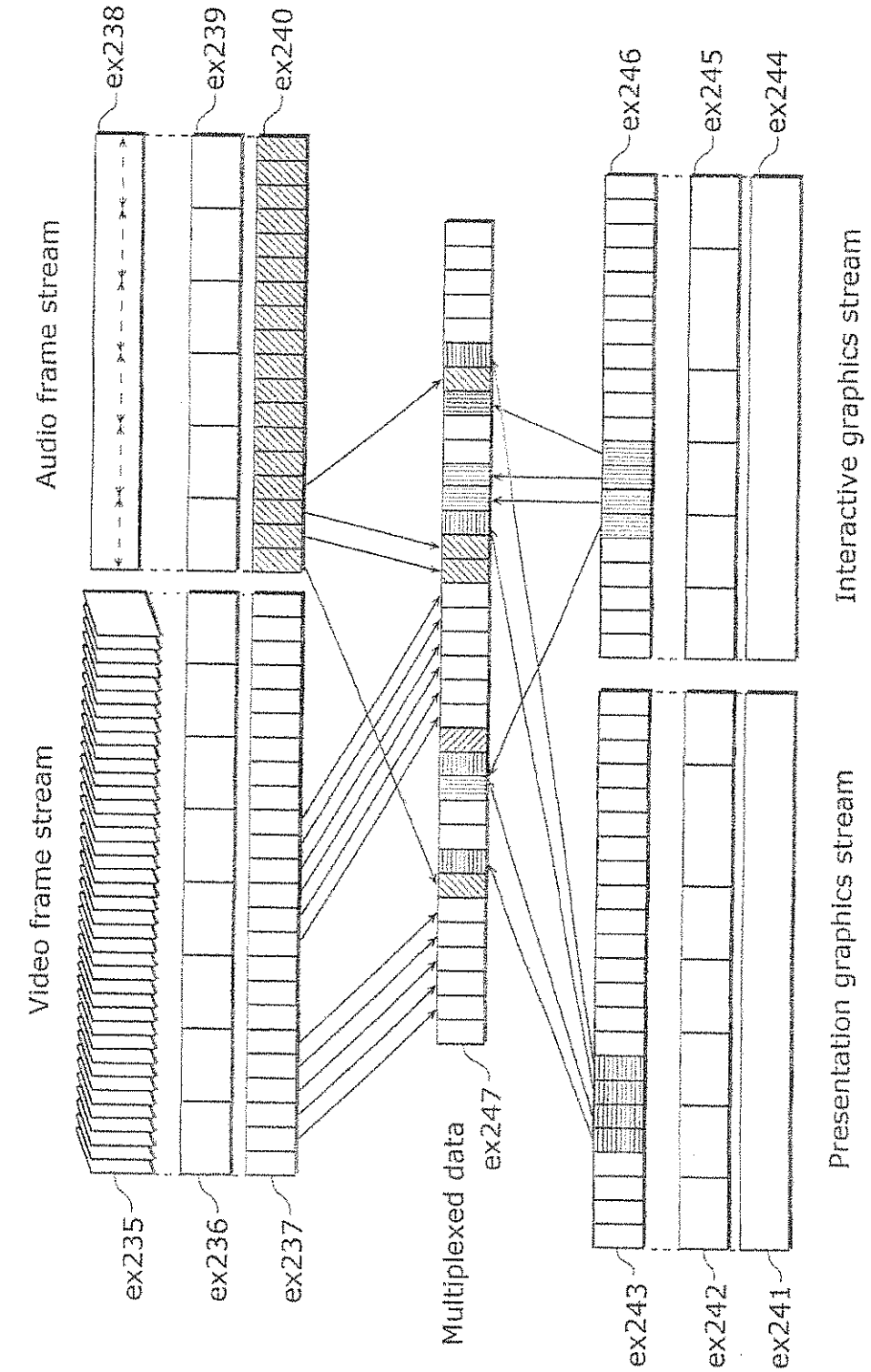

Video frame stream
Audio frame stream
Presentation graphics stream
Interactive graphics stream
Multiplexed data
ex235
ex236
ex237
ex238
ex239
ex240
ex241
ex242
ex243
ex244
ex245
ex246
ex247

FIG. 28

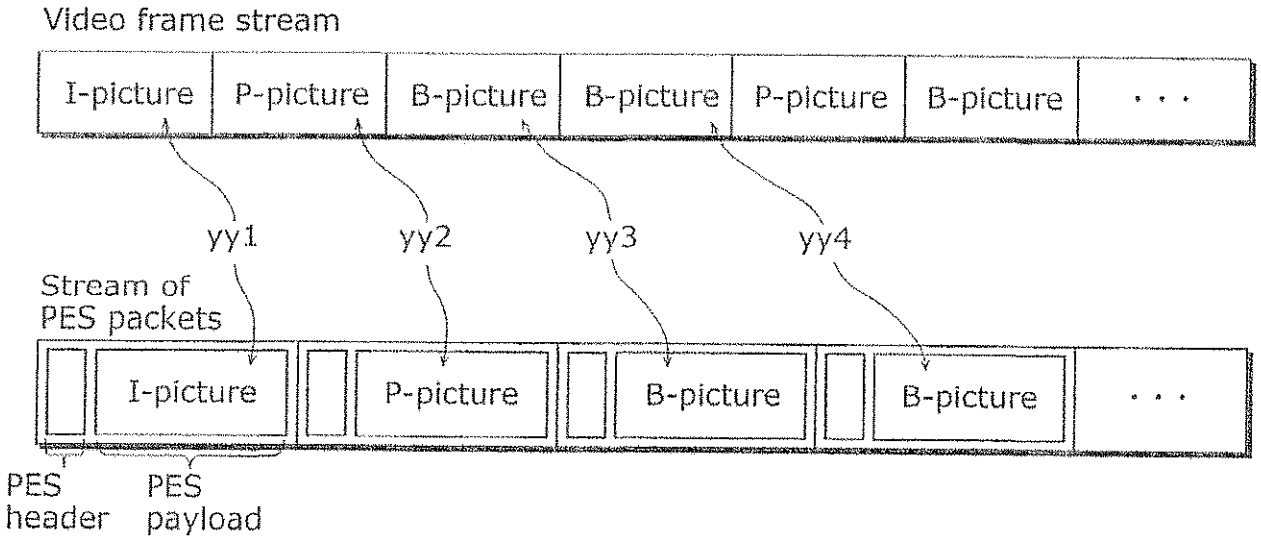
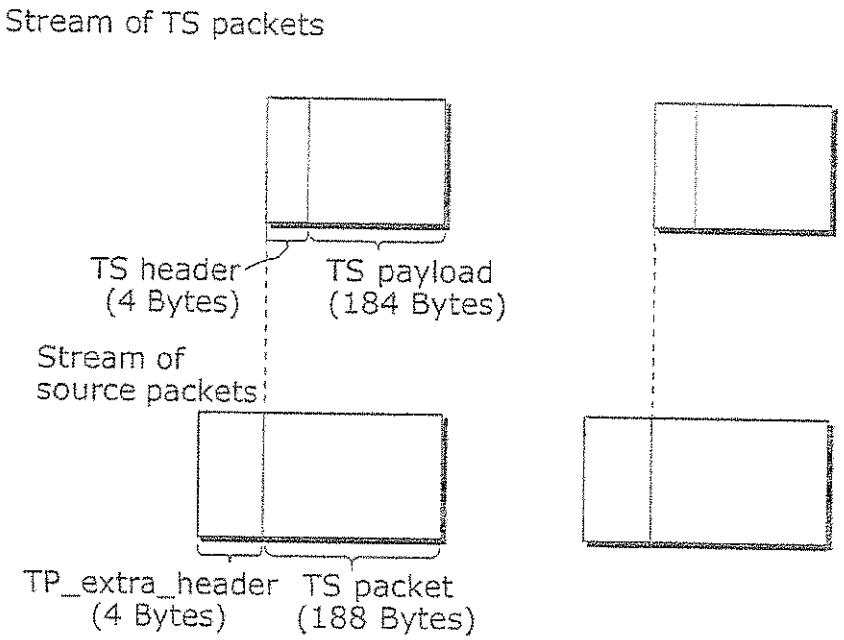

Video frame stream
I-picture
P-picture
B-picture
B-picture
P-picture
B-picture
yy1
yy2
yy3
yy4
Stream of
PES packets
I-picture
P-picture
B-picture
B-picture
PES
header
PES
payload

FIG. 29


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)

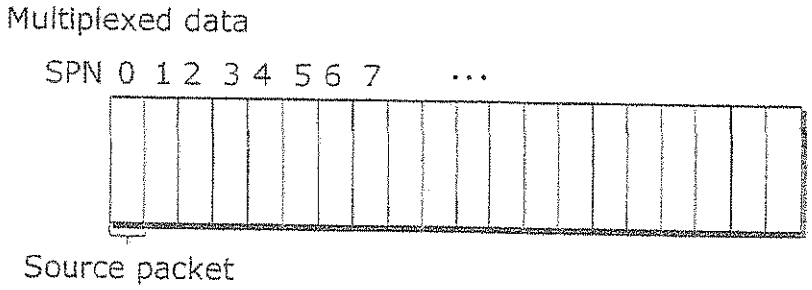

Multiplexed data
SPN 0 1 2 3 4 5 6 7 ...
Source packet

FIG. 30

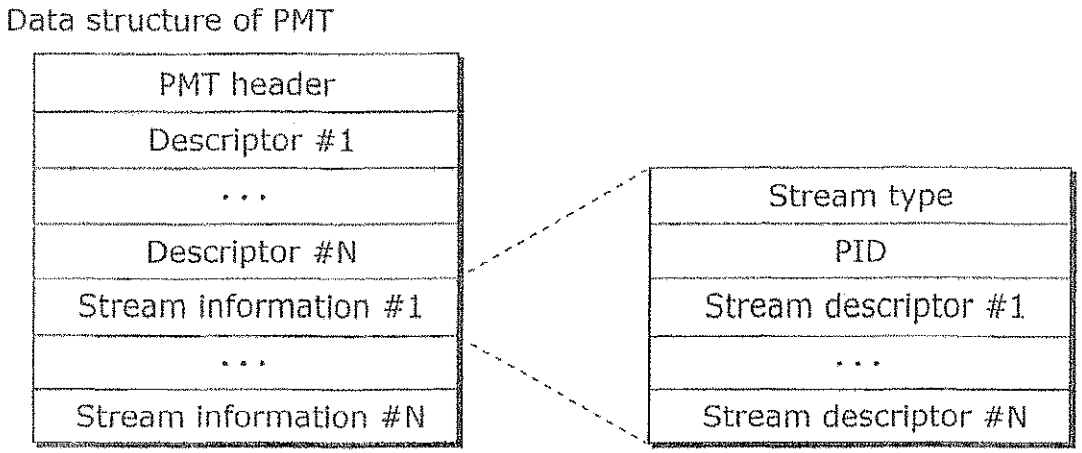

Data structure of PMT
PMT header
Descriptor #1
...
Descriptor #N
Stream information #1
...
Stream information #N
Stream type
PID
Stream descriptor #1
...
Stream descriptor #N

FIG. 31

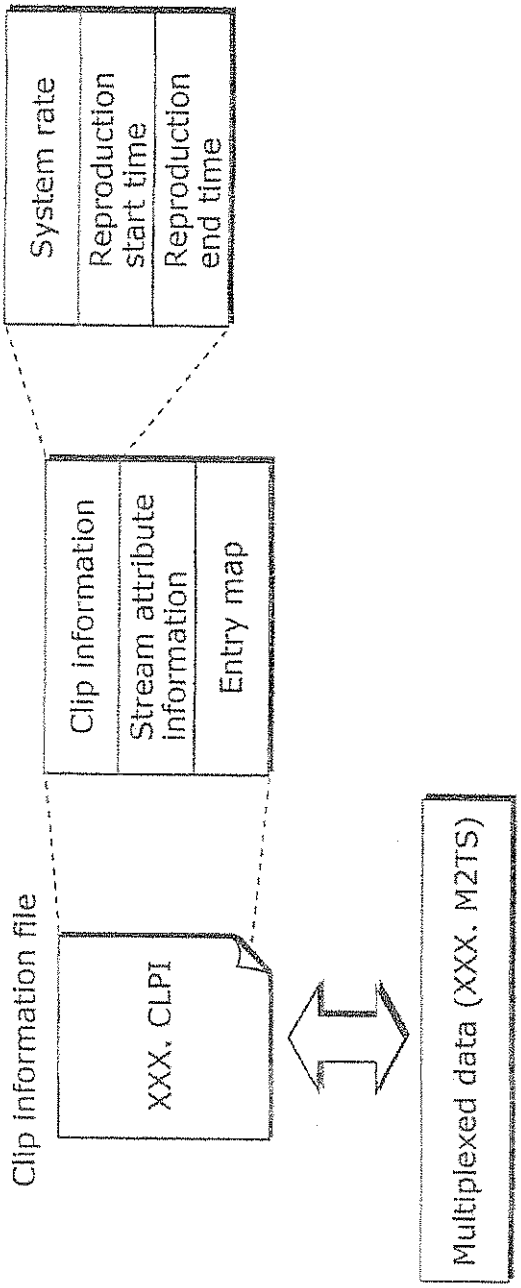

Clip information file
XXX. CLPI
Clip information
Stream attribute information
Entry map
System rate
Reproduction start time
Reproduction end time
Multiplexed data (XXX. M2TS)

FIG. 32

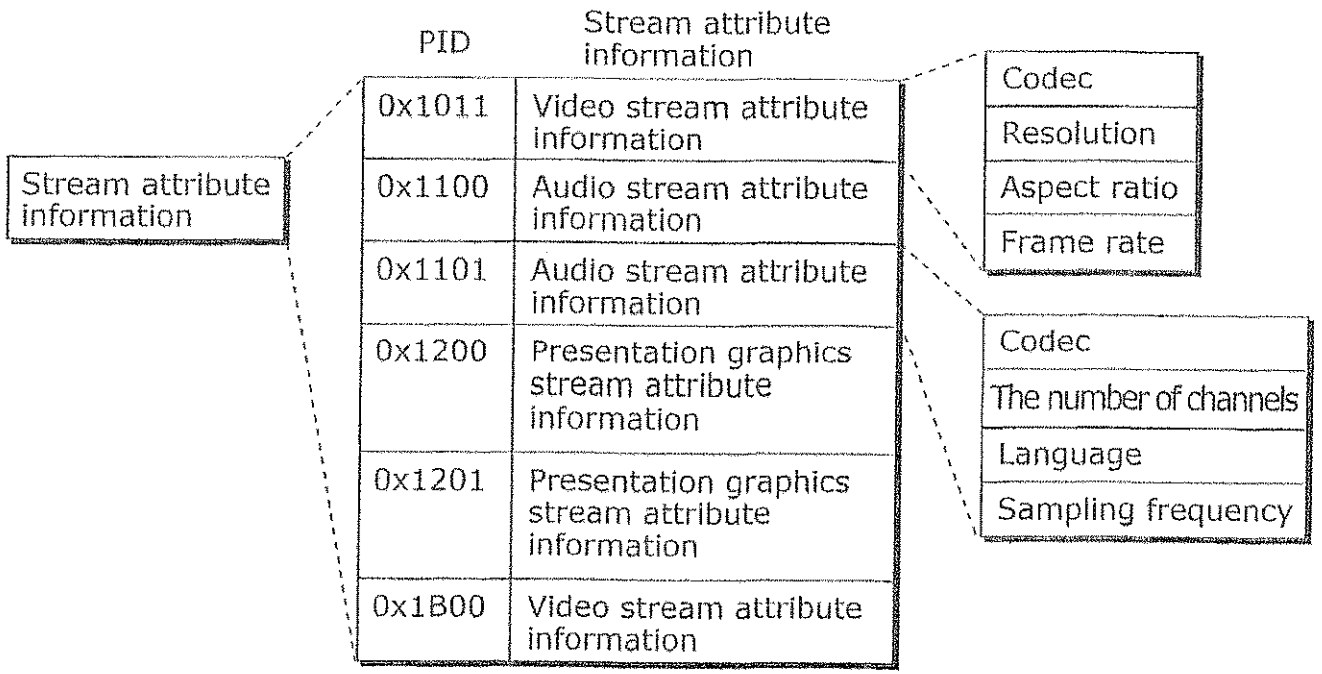

Stream attribute information
PID
Stream attribute information
0x1011
Video stream attribute information
0x1100
Audio stream attribute information
0x1101
Audio stream attribute information
0x1200
Presentation graphics stream attribute information
0x1201
Presentation graphics stream attribute information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

FIG. 33

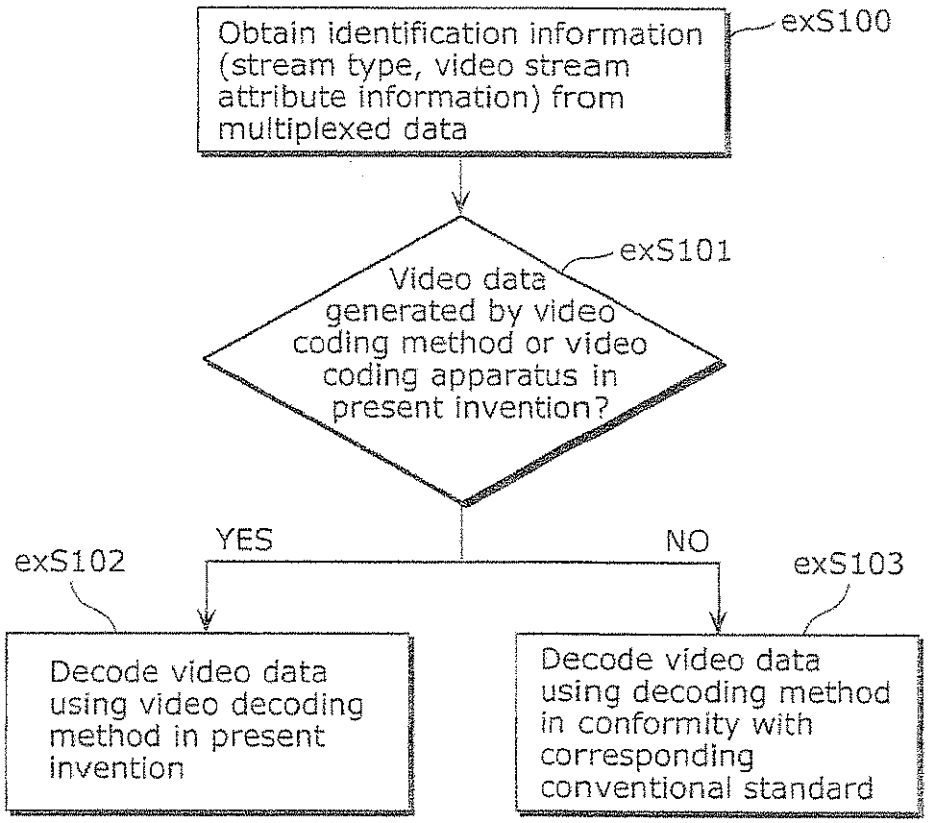

Obtain identification information (stream type, video stream attribute information) from multiplexed data
exS100
Video data generated by video coding method or video coding apparatus in present invention?
exS101
YES
NO
exS102
exS103
Decode video data using video decoding method in present invention
Decode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

FIG. 34

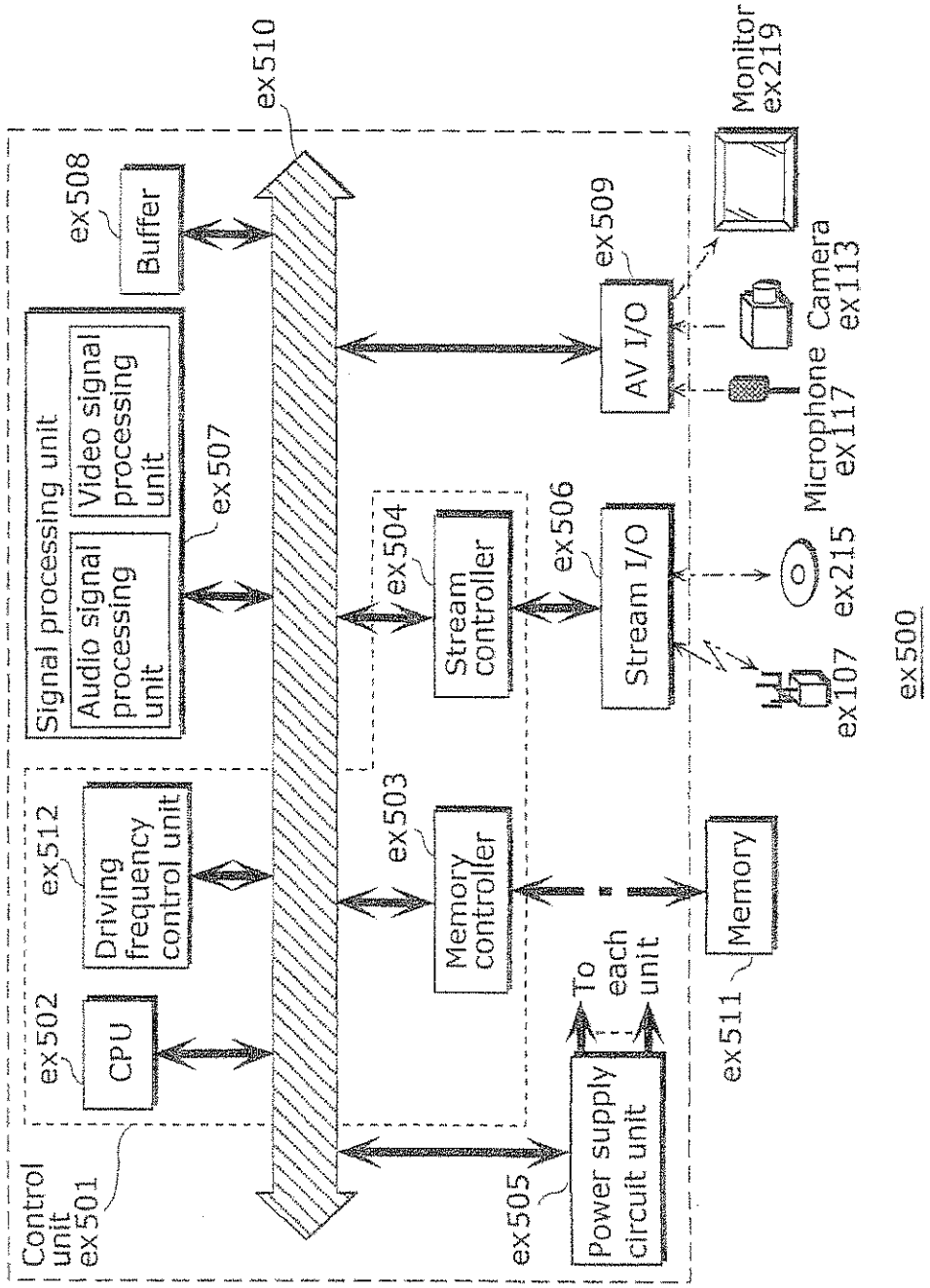
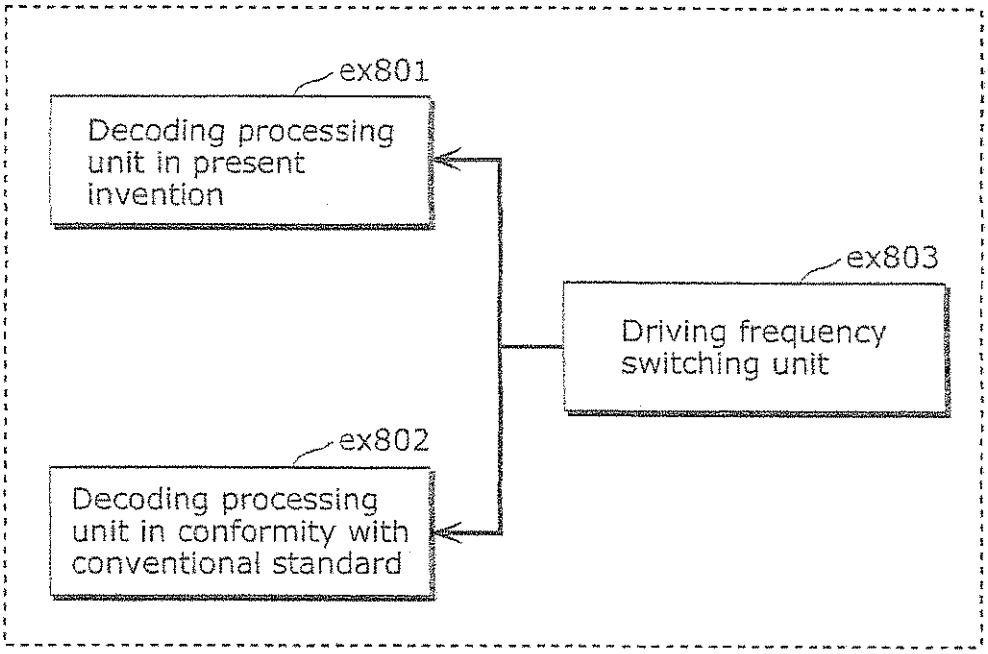

Control unit ex501
ex502
CPU
ex512
Driving frequency control unit
Signal processing unit
Audio signal processing unit
Video signal processing unit
ex507
ex508
Buffer
ex510
ex503
Memory controller
ex504
Stream controller
ex506
Stream I/O
ex509
AV I/O
ex505
Power supply circuit unit
To each unit
ex511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

FIG. 35


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

ex800

FIG. 36

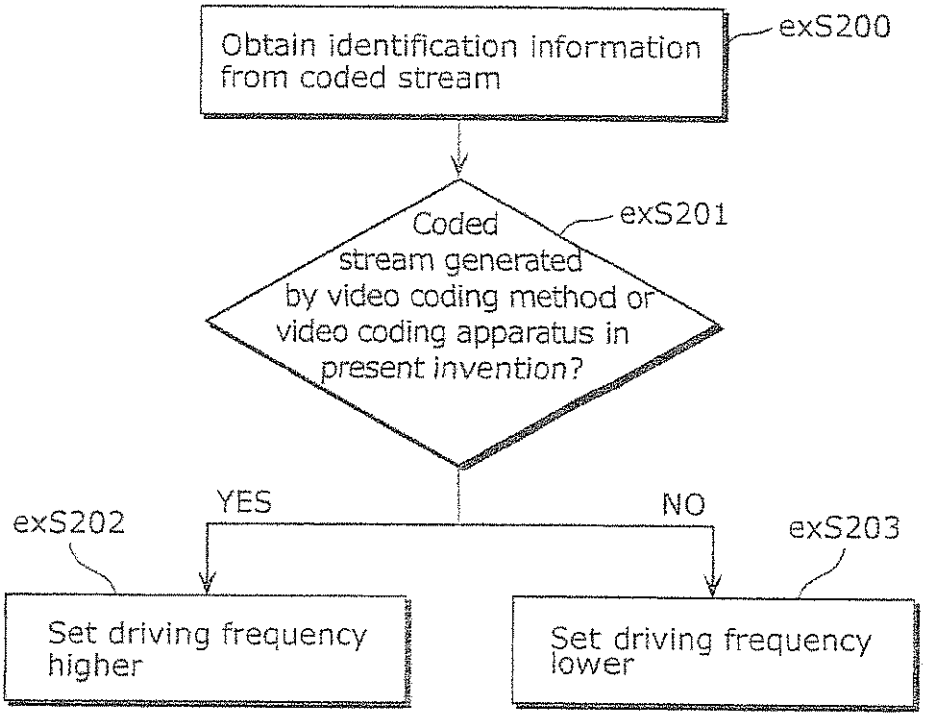

Obtain identification information from coded stream
exS200
Coded stream generated by video coding method or video coding apparatus in present invention?
exS201
YES
NO
exS202
exS203
Set driving frequency higher
Set driving frequency lower

FIG. 37

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

FIG. 38A

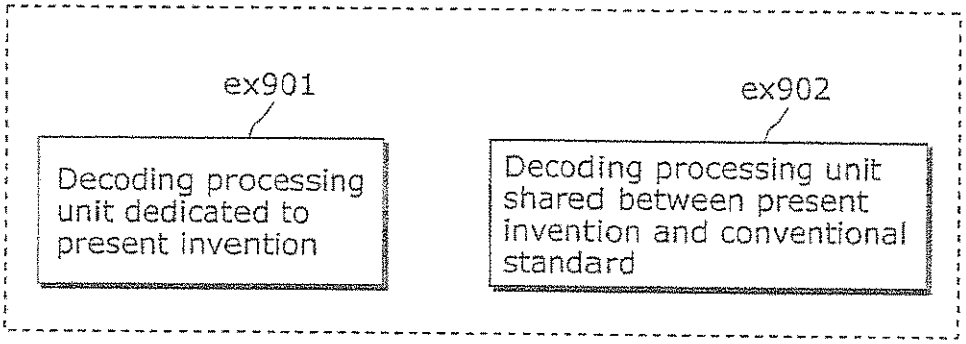


FIG. 38B

