FIG. 1

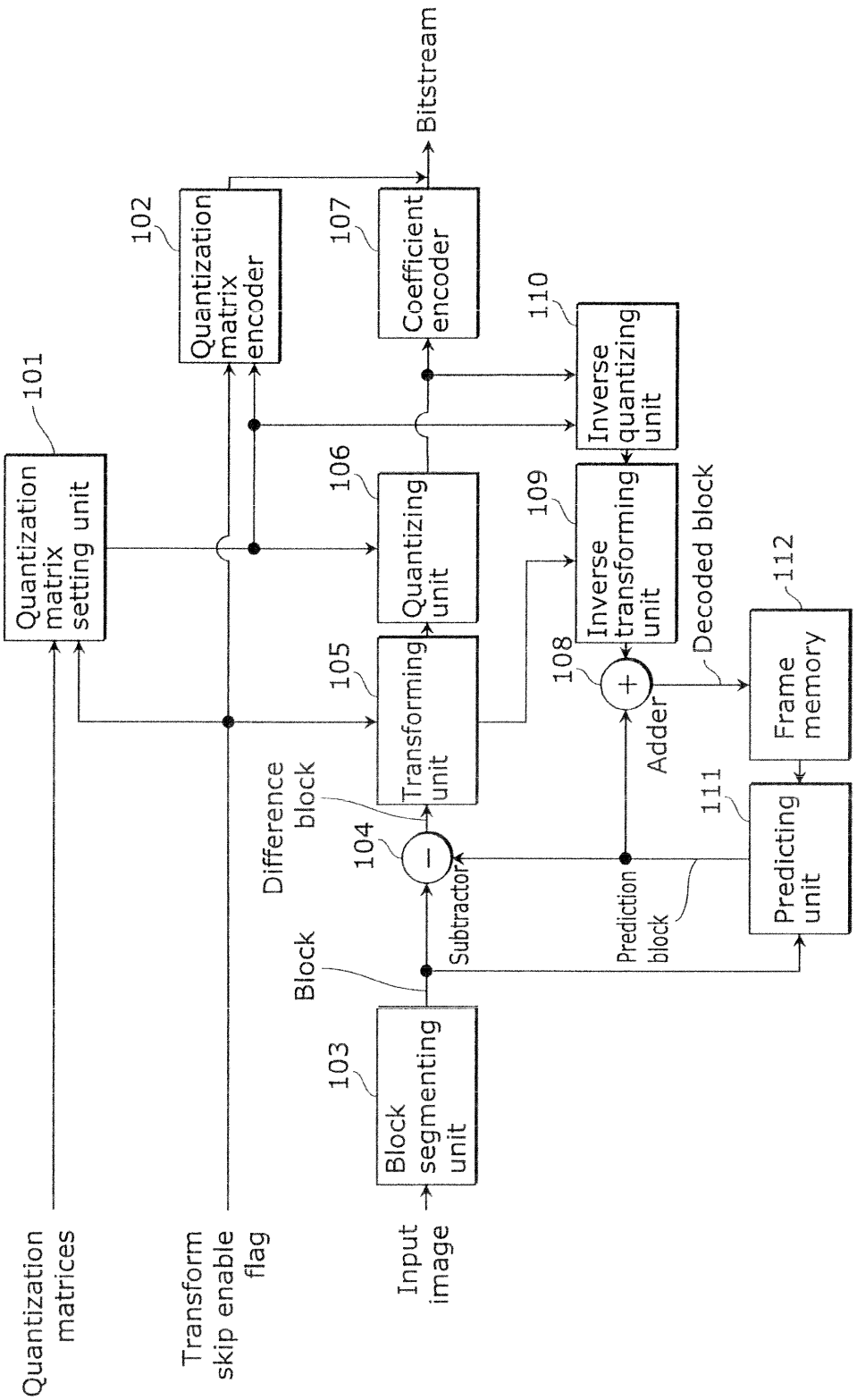

Quantization matrices
Transform skip enable flag
Input image
Quantization matrix setting unit
101
Quantization matrix encoder
102
Block segmenting unit
103
Block
Subtractor
104
Difference block
Transforming unit
105
Quantizing unit
106
Coefficient encoder
107
Bitstream
Inverse transforming unit
109
Adder
108
Inverse quantizing unit
110
Decoded block
Frame memory
112
Predicting unit
111
Prediction block

FIG. 2

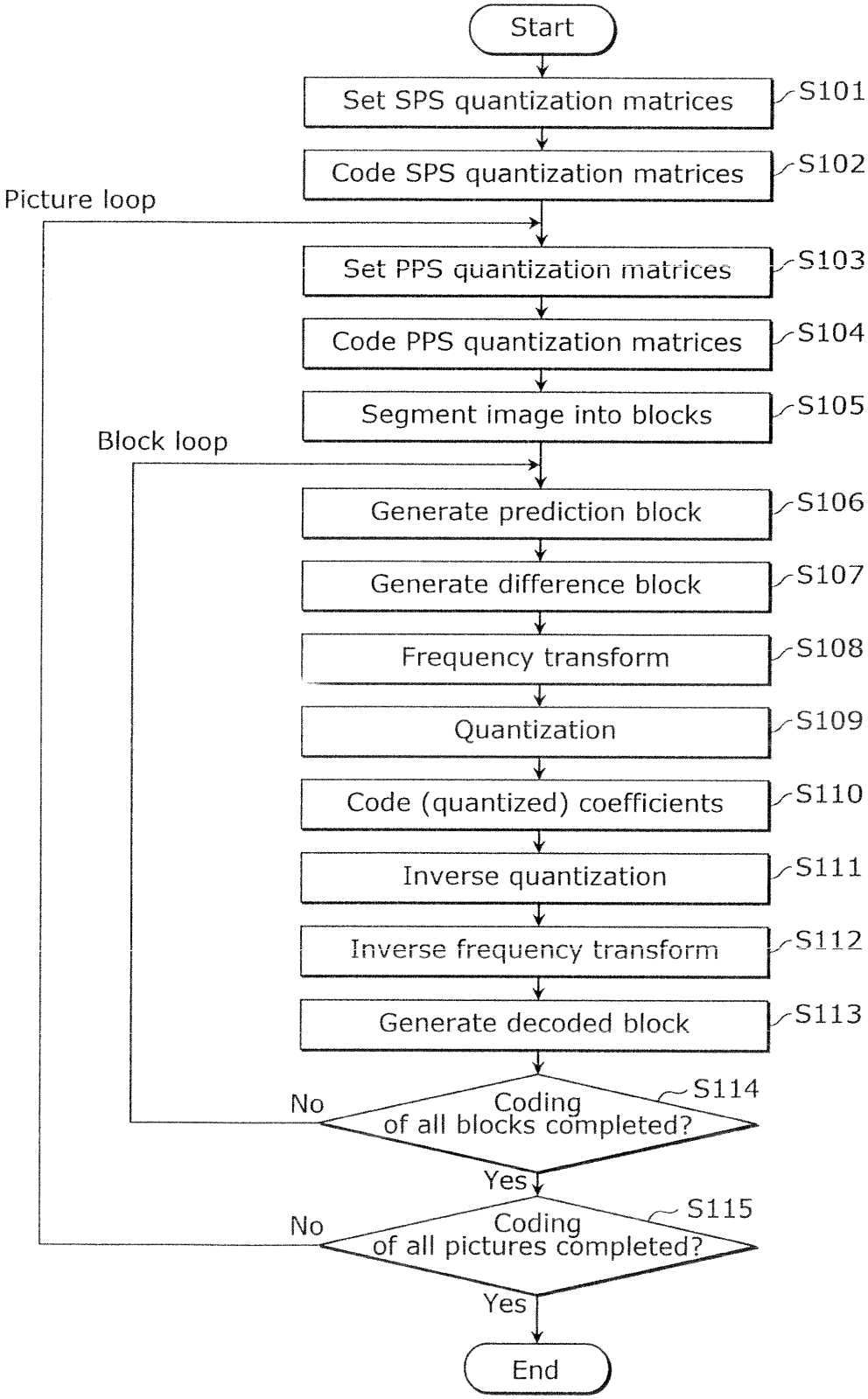

Start
Set SPS quantization matrices
S101
Code SPS quantization matrices
S102
Picture loop
Set PPS quantization matrices
S103
Code PPS quantization matrices
S104
Segment image into blocks
S105
Block loop
Generate prediction block
S106
Generate difference block
S107
Frequency transform
S108
Quantization
S109
Code (quantized) coefficients
S110
Inverse quantization
S111
Inverse frequency transform
S112
Generate decoded block
S113
Coding of all blocks completed?
S114
No
Yes
Coding of all pictures completed?
S115
No
Yes
End

FIG. 3

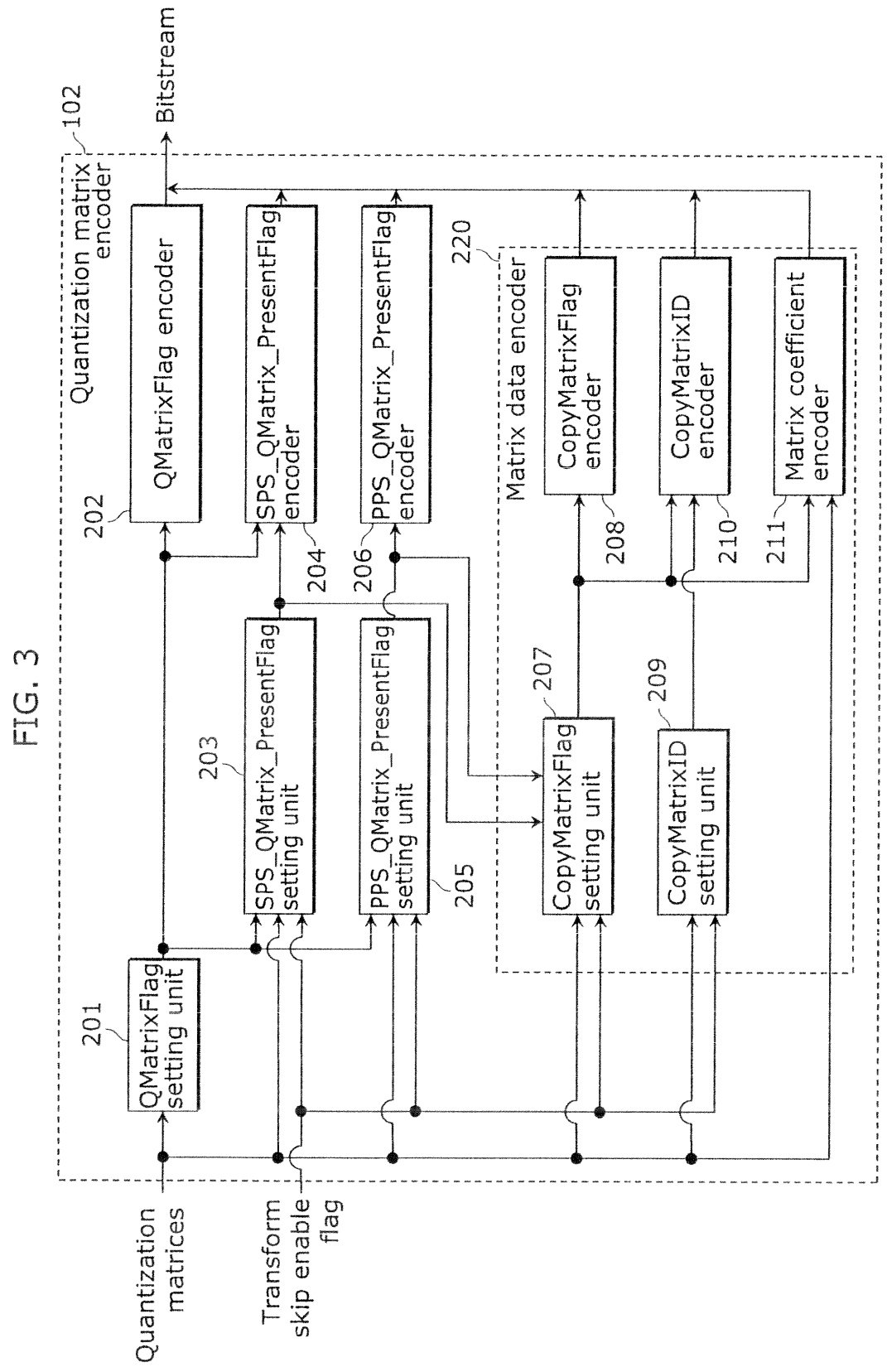

Quantization matrix encoder
102
Bitstream
QMatrixFlag encoder
202
SPS_QMatrix_PresentFlag encoder
204
PPS_QMatrix_PresentFlag encoder
206
Matrix data encoder
220
CopyMatrixFlag encoder
208
CopyMatrixID encoder
210
Matrix coefficient encoder
211
QMatrixFlag setting unit
201
SPS_QMatrix_PresentFlag setting unit
203
PPS_QMatrix_PresentFlag setting unit
205
CopyMatrixFlag setting unit
207
CopyMatrixID setting unit
209
Quantization matrices
Transform skip enable flag

FIG. 4A

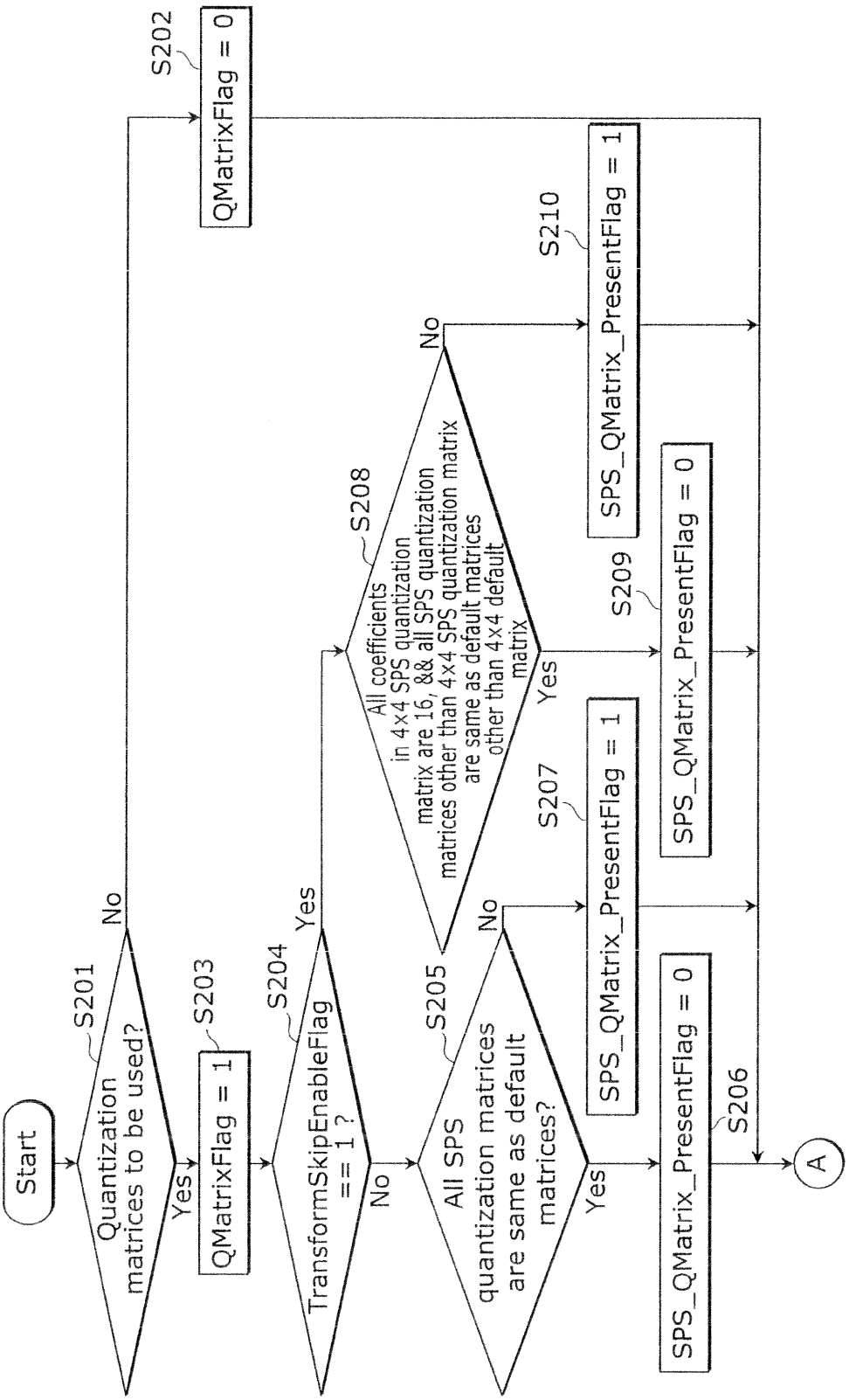

Start
S201
Quantization matrices to be used?
No
Yes
S202
QMatrixFlag = 0
S203
QMatrixFlag = 1
S204
TransformSkipEnableFlag == 1 ?
Yes
No
S205
All SPS quantization matrices are same as default matrices?
No
Yes
S206
SPS_QMatrix_PresentFlag = 0
S207
SPS_QMatrix_PresentFlag = 1
S208
All coefficients in 4x4 SPS quantization matrix are 16, && all SPS quantization matrices other than 4x4 SPS quantization matrix are same as default matrices other than 4x4 default matrix
No
Yes
S209
SPS_QMatrix_PresentFlag = 0
S210
SPS_QMatrix_PresentFlag = 1
A

FIG. 4B

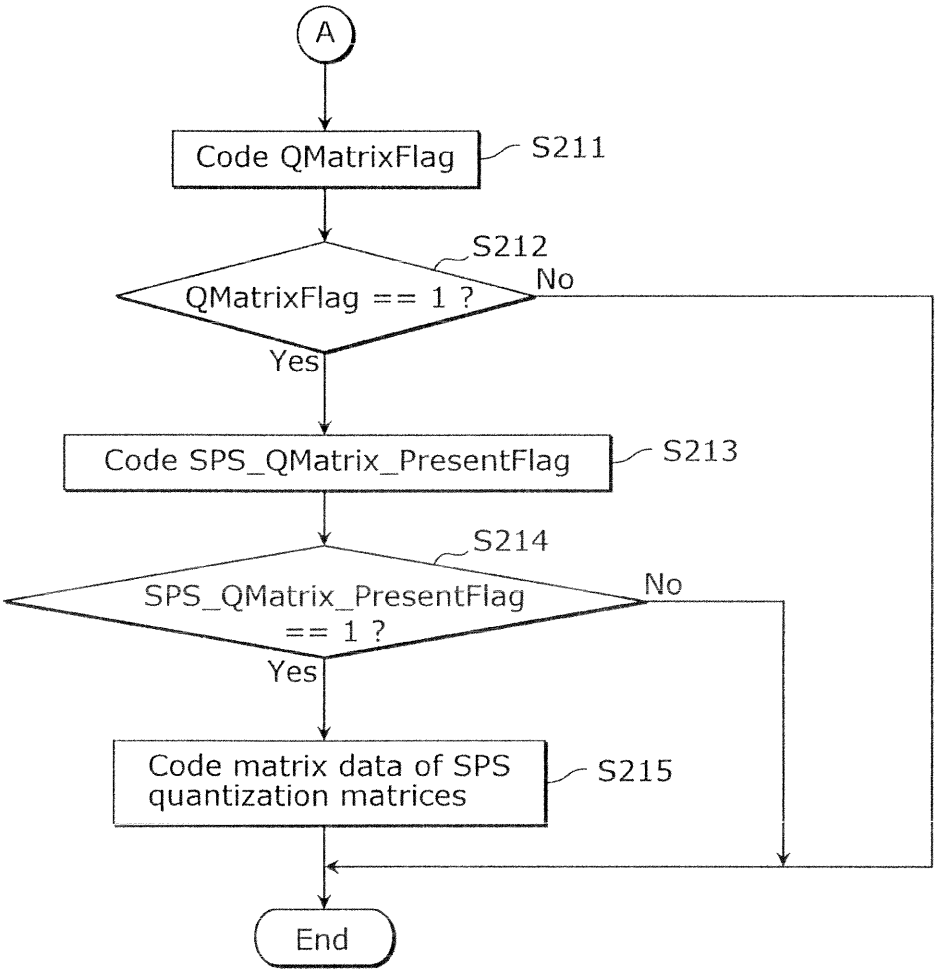

A
Code QMatrixFlag
S211
S212
QMatrixFlag == 1 ?
No
Yes
Code SPS_QMatrix_PresentFlag
S213
S214
SPS_QMatrix_PresentFlag == 1 ?
No
Yes
Code matrix data of SPS quantization matrices
S215
End

FIG. 5A

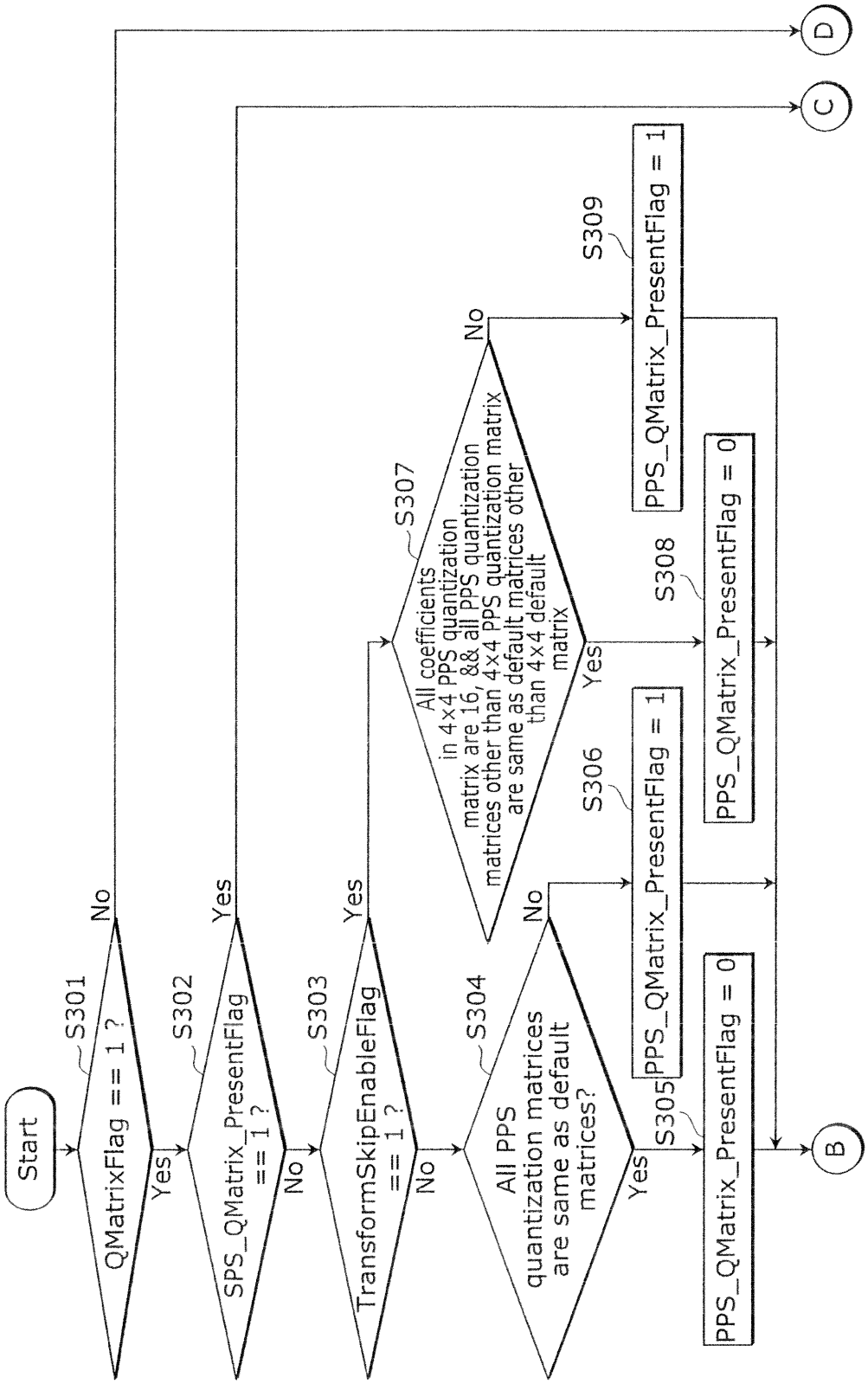

Start
S301
QMatrixFlag == 1 ?
No
Yes
S302
SPS_QMatrix_PresentFlag == 1 ?
Yes
No
S303
TransformSkipEnableFlag == 1 ?
Yes
No
S304
All PPS quantization matrices are same as default matrices?
No
Yes
S305
PPS_QMatrix_PresentFlag = 0
S306
PPS_QMatrix_PresentFlag = 1
S307
All coefficients in 4x4 PPS quantization matrix are 16, && all PPS quantization matrices other than 4x4 PPS quantization matrix are same as default matrices other than 4x4 default matrix
No
Yes
S308
PPS_QMatrix_PresentFlag = 0
S309
PPS_QMatrix_PresentFlag = 1
B
C
D

FIG. 5B

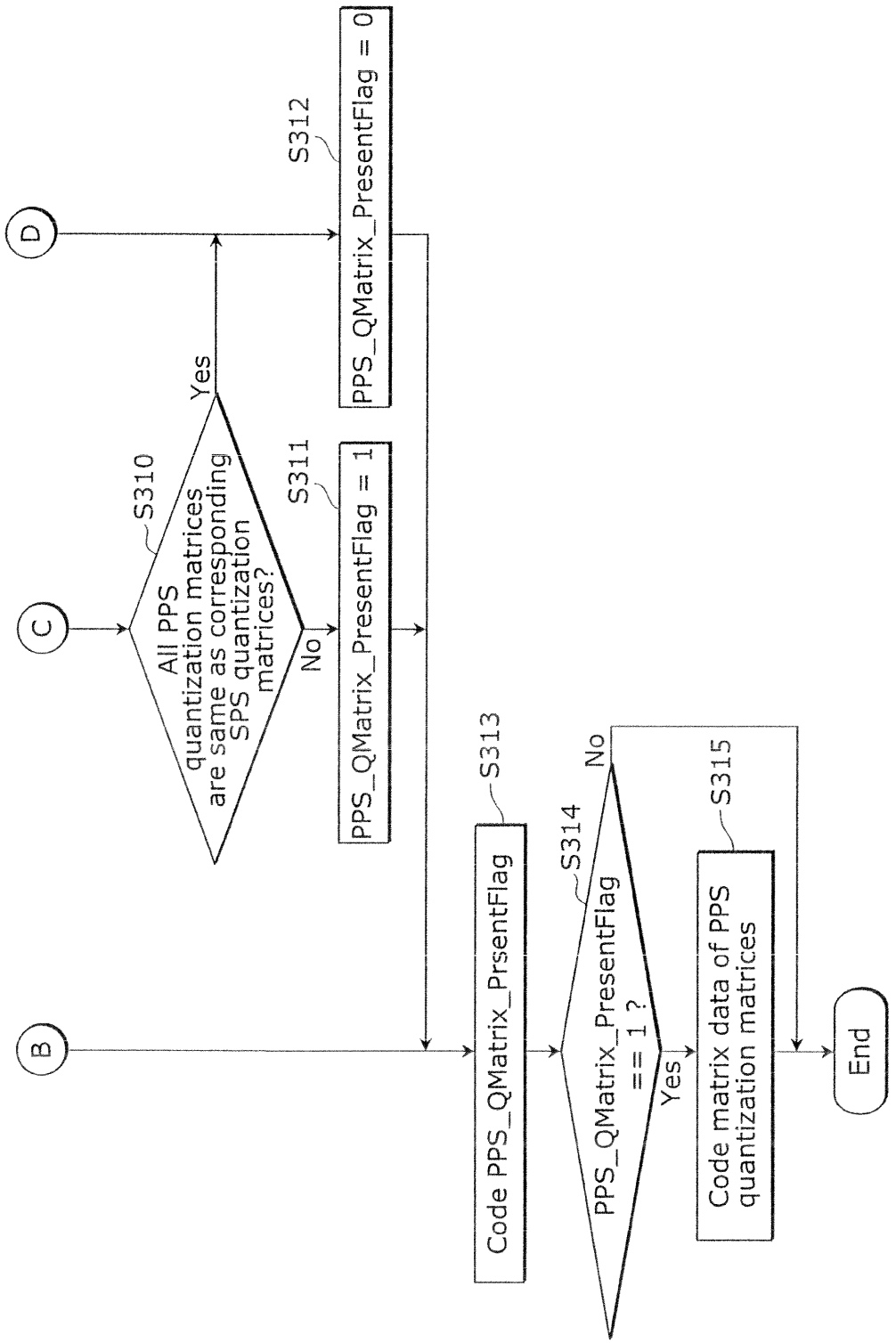

B
C
D
S310
All PPS quantization matrices are same as corrization SPS quantization matrices?
Yes
No
S311
PPS_QMatrix_PresentFlag = 1
S312
PPS_QMatrix_PresentFlag = 0
S313
Code PPS_QMatrix_PrsentFlag
S314
PPS_QMatrix_PresentFlag == 1 ?
Yes
No
S315
Code matrix data of PPS quantization matrices
End

FIG. 6A

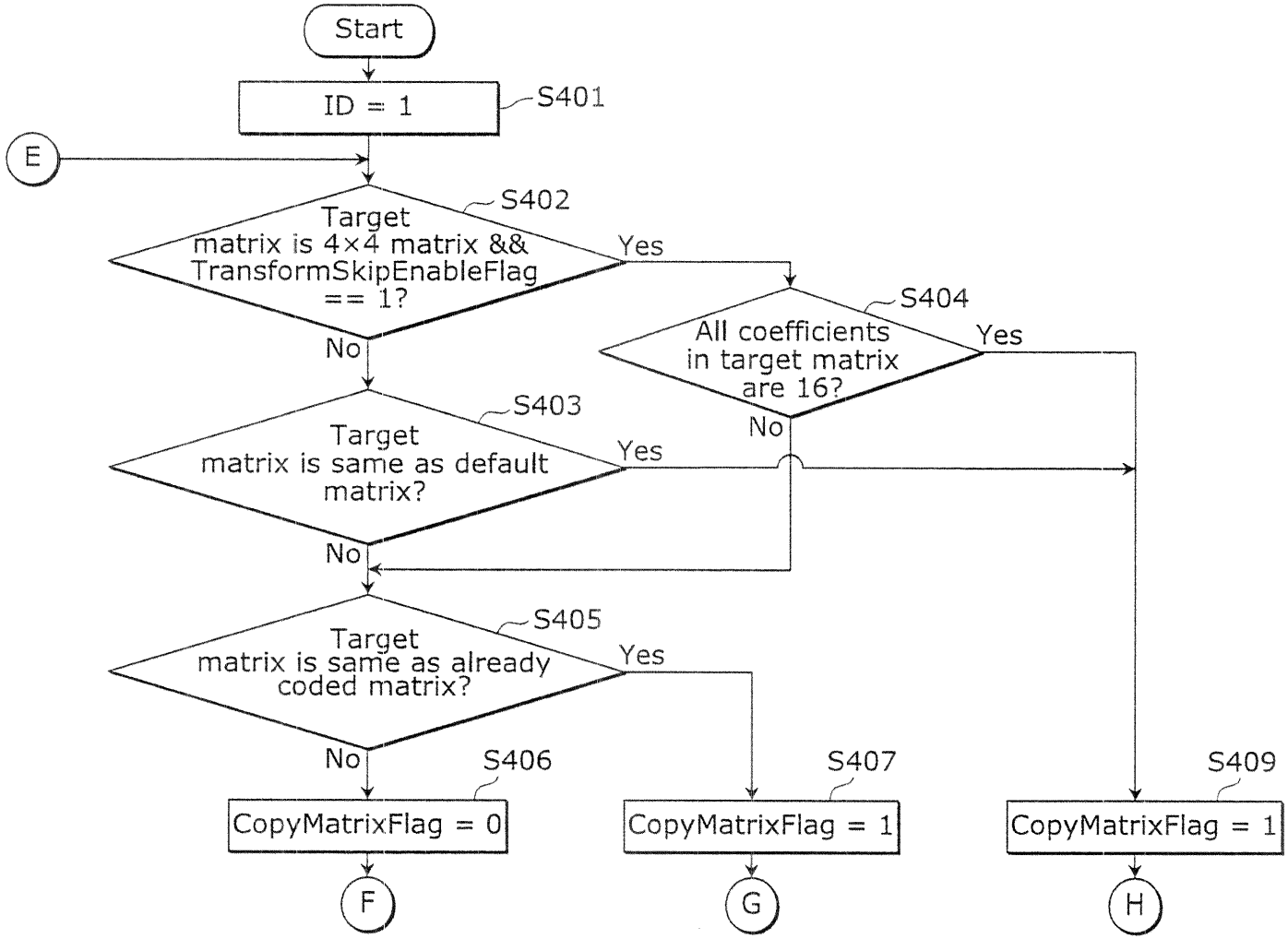

Start
ID = 1
S401
E
S402
Target matrix is 4×4 matrix && TransformSkipEnableFlag == 1?
Yes
No
S404
All coefficients in target matrix are 16?
Yes
No
S403
Target matrix is same as default matrix?
Yes
No
S405
Target matrix is same as already coded matrix?
Yes
No
S406
CopyMatrixFlag = 0
S407
CopyMatrixFlag = 1
S409
CopyMatrixFlag = 1
F
G
H

FIG. 6B

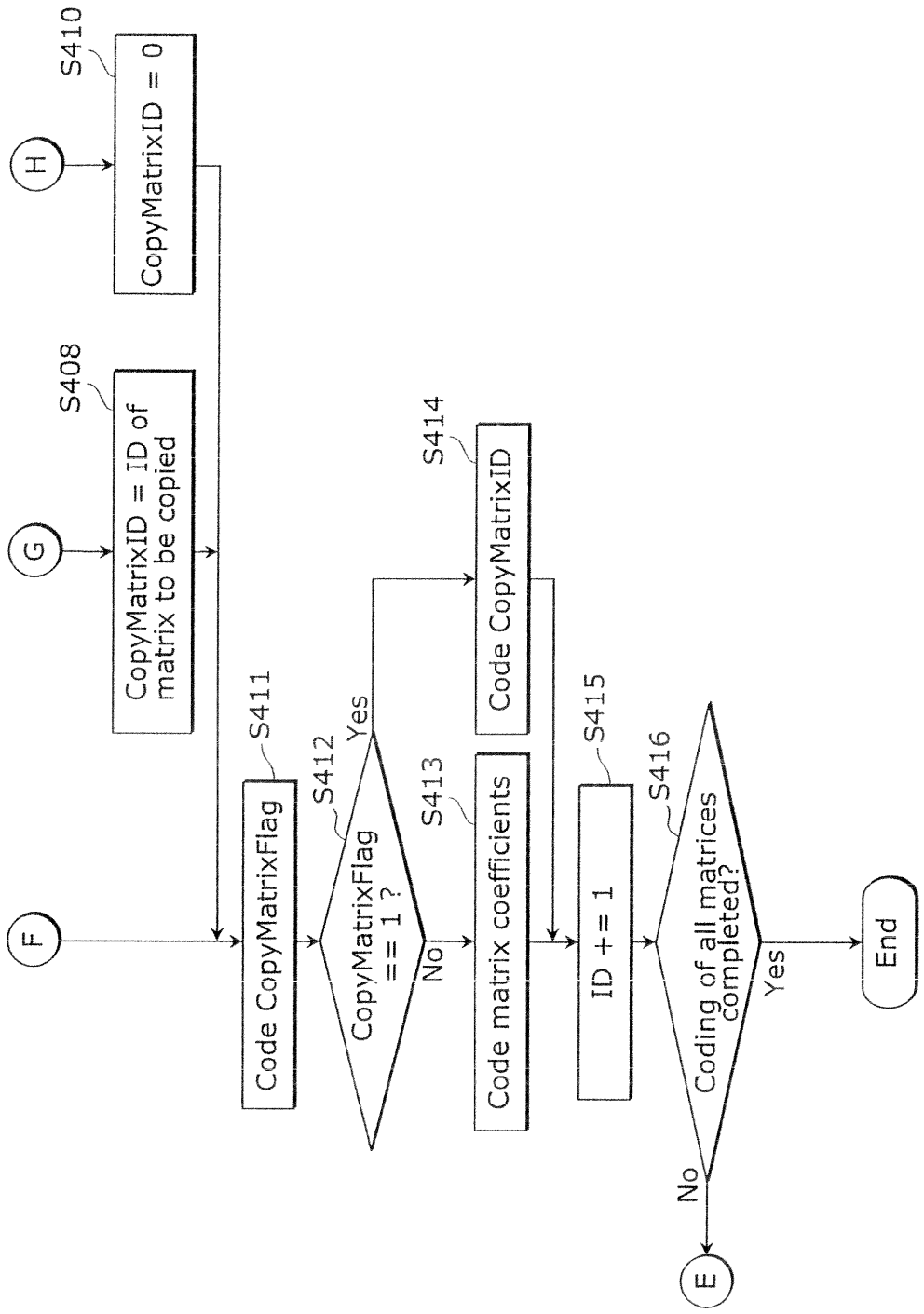

F
G
H
S408
CopyMatrixID = ID of matrix to be copied
S410
CopyMatrixID = 0
S411
Code CopyMatrixFlag
S412
CopyMatrixFlag == 1 ?
Yes
No
S413
Code matrix coefficients
S414
Code CopyMatrixID
S415
ID += 1
S416
Coding of all matrices completed?
Yes
No
E
End

FIG. 7

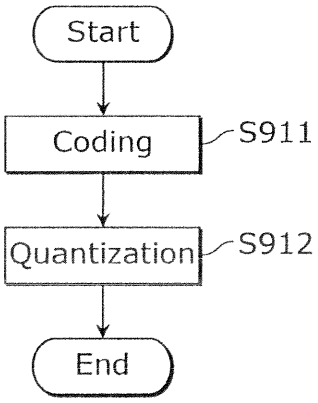


FIG. 8

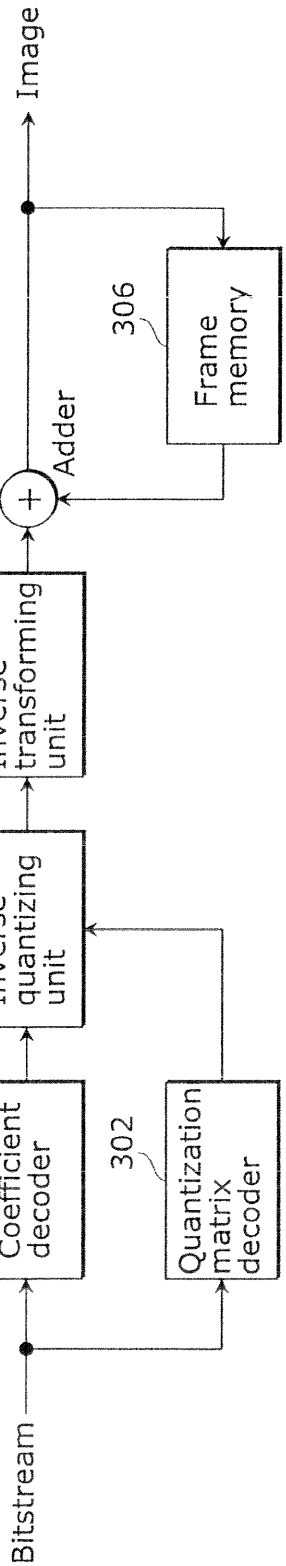

Bitstream
301
Coefficient decoder
302
Quantization matrix decoder
303
Inverse quantizing unit
304
Inverse transforming unit
305
Adder
306
Frame memory
Image

FIG. 9

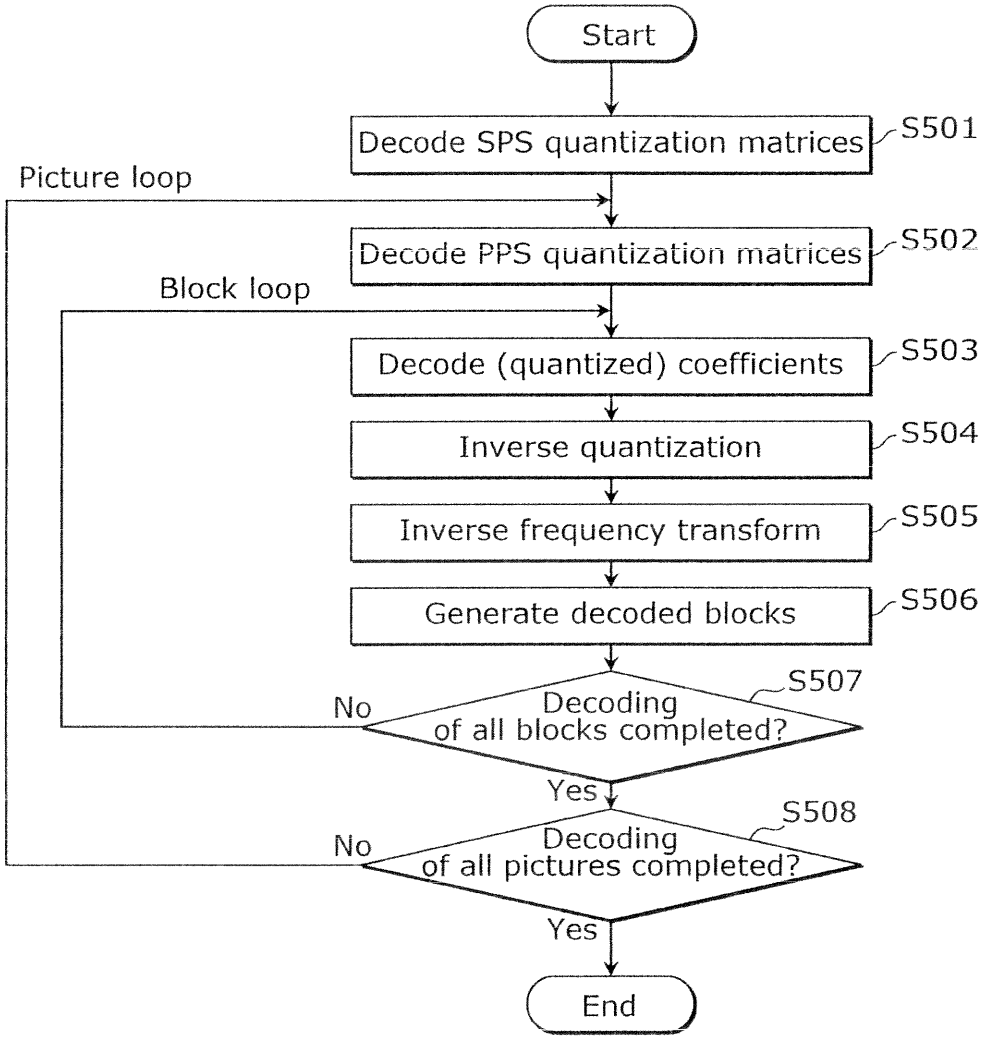

Start
Decode SPS quantization matrices
S501
Picture loop
Decode PPS quantization matrices
S502
Block loop
Decode (quantized) coefficients
S503
Inverse quantization
S504
Inverse frequency transform
S505
Generate decoded blocks
S506
Decoding of all blocks completed?
S507
No
Yes
Decoding of all pictures completed?
S508
No
Yes
End

FIG. 10

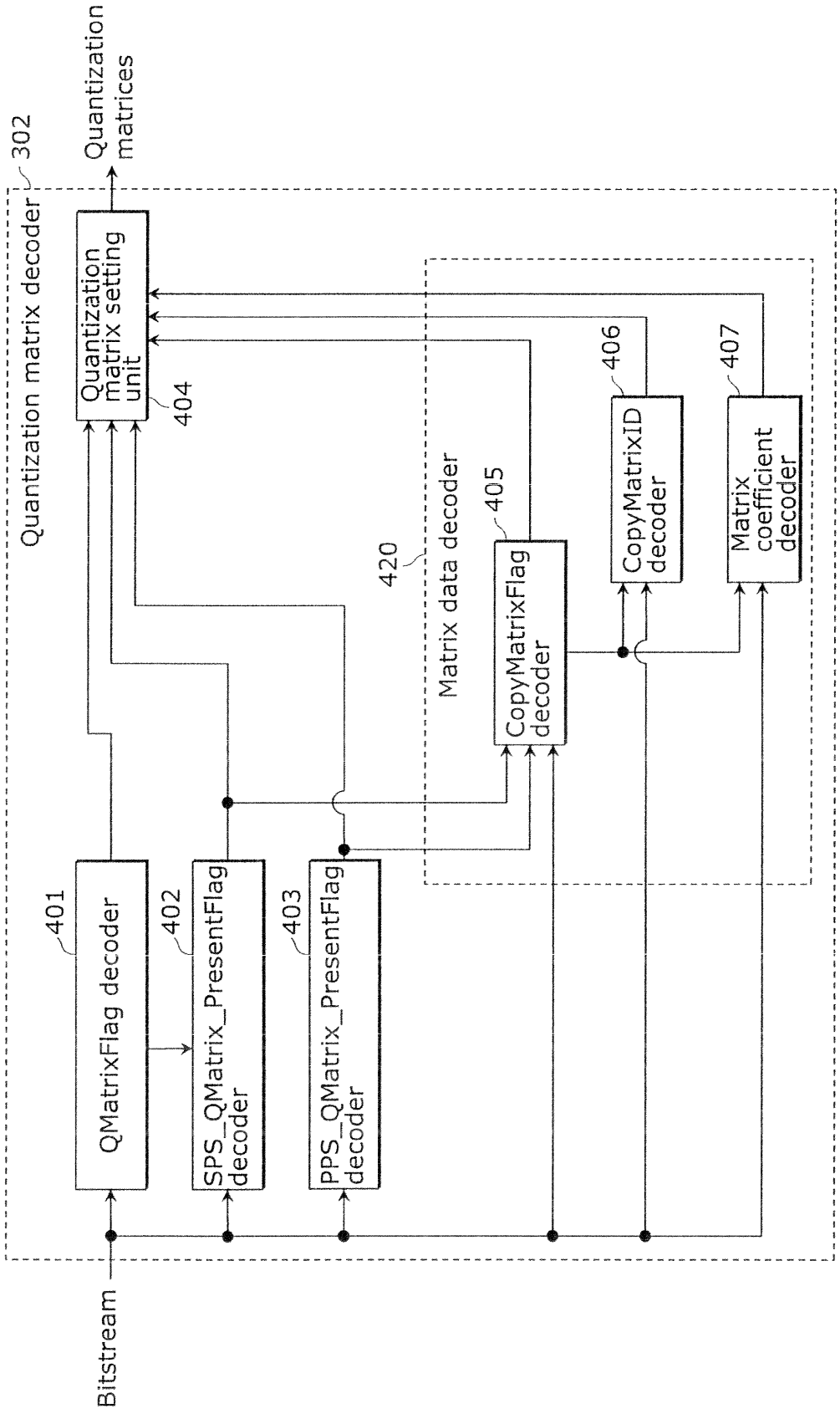

Bitstream
Quantization matrix decoder
302
Quantization matrices
Quantization matrix setting unit
404
401
QMatrixFlag decoder
402
SPS_QMatrix_PresentFlag decoder
403
PPS_QMatrix_PresentFlag decoder
420
Matrix data decoder
405
CopyMatrixFlag decoder
406
CopyMatrixID decoder
407
Matrix coefficient decoder

FIG. 11

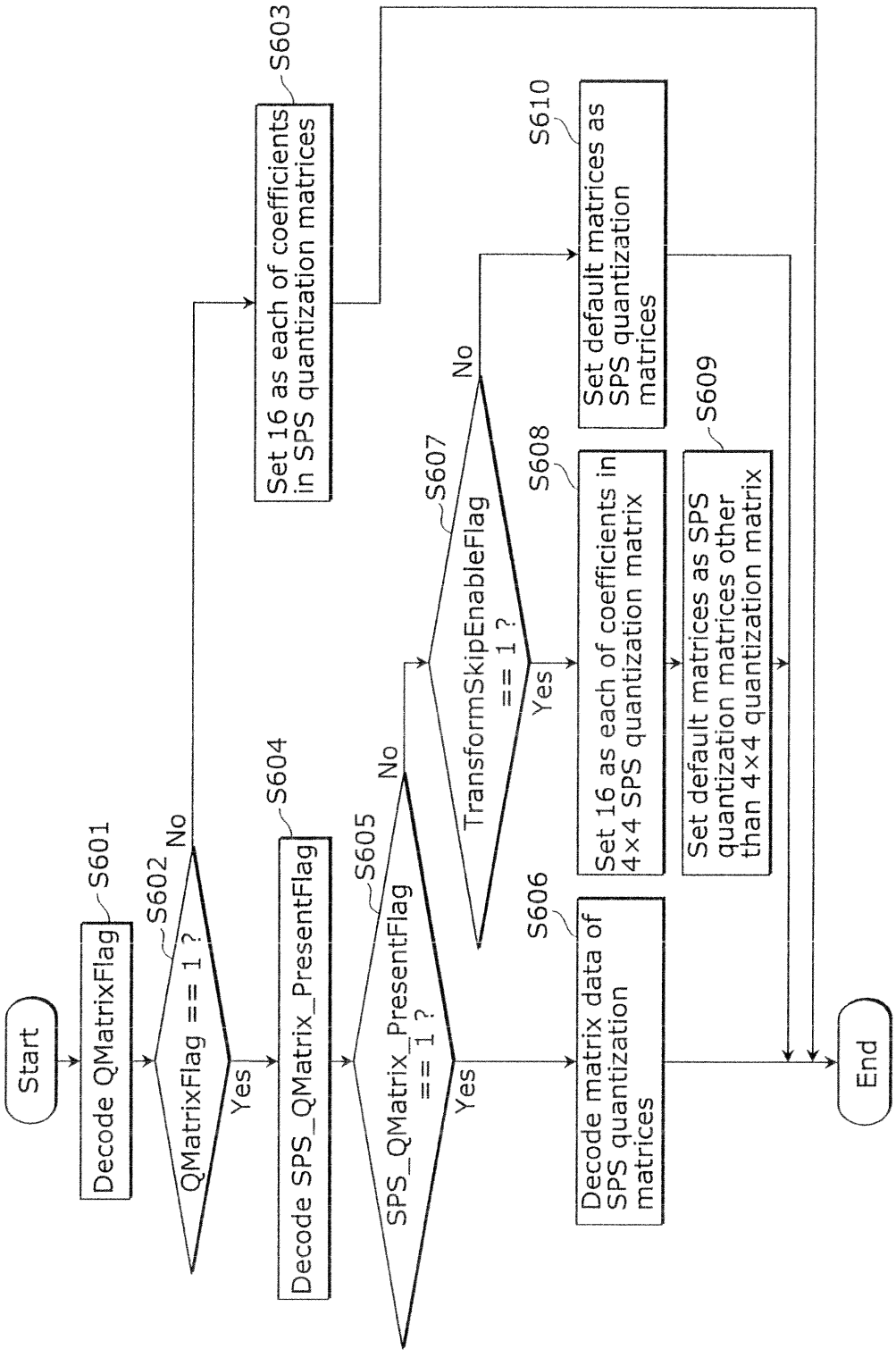

Start
Decode QMatrixFlag
S601
QMatrixFlag == 1 ?
S602
No
Yes
Set 16 as each of coefficients in SPS quantization matrices
S603
Decode SPS_QMatrix_PresentFlag
S604
SPS_QMatrix_PresentFlag == 1 ?
S605
No
Yes
TransformSkipEnableFlag == 1 ?
S607
No
Yes
Decode matrix data of SPS quantization matrices
S606
Set 16 as each of coefficients in 4×4 SPS quantization matrix
S608
Set default matrices as SPS quantization matrices
S610
Set default matrices as SPS quantization matrices other than 4×4 quantization matrix
S609
End

FIG. 12

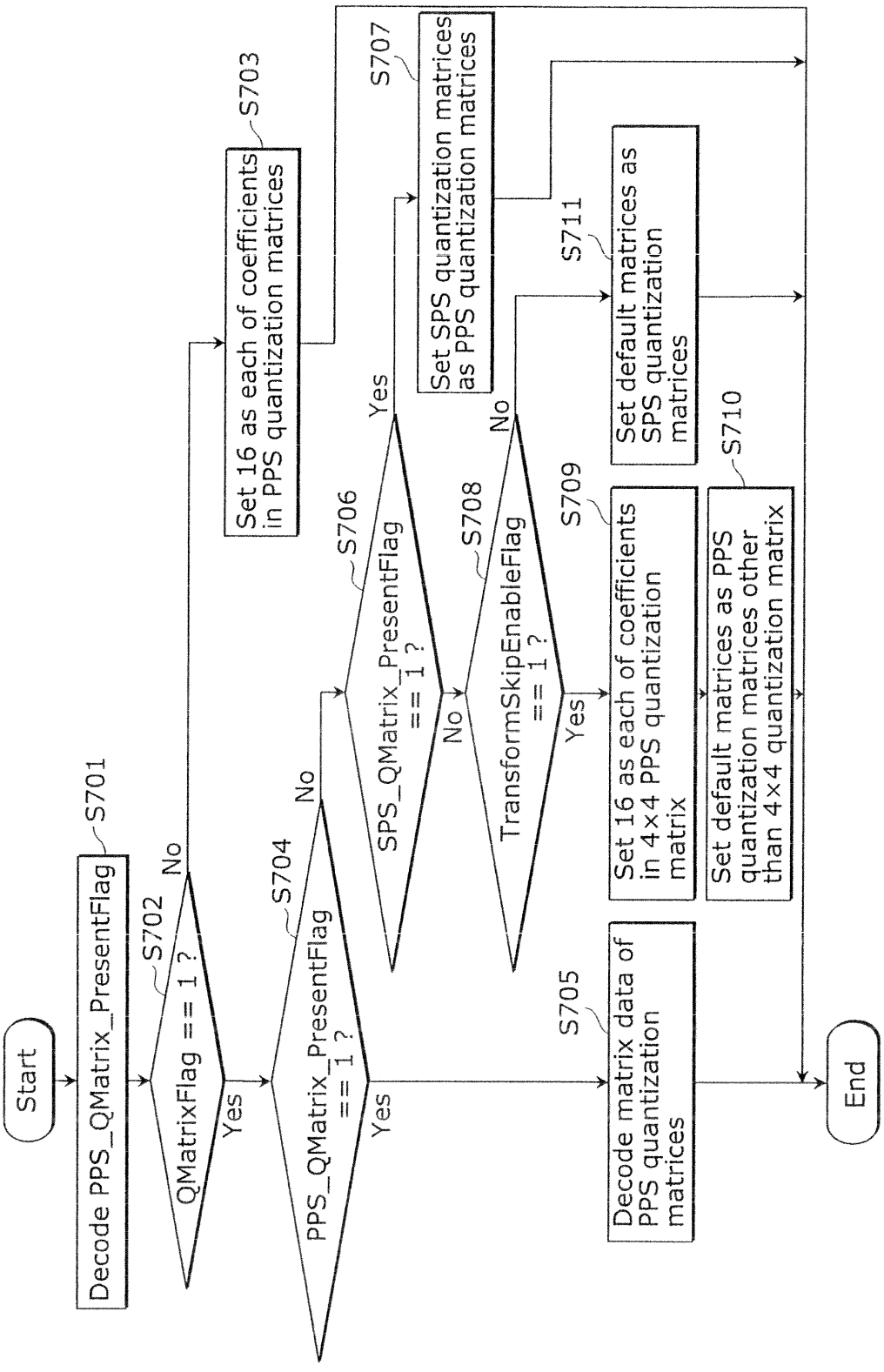

Start
Decode PPS_QMatrix_PresentFlag
S701
QMatrixFlag == 1 ?
S702
No
Yes
Set 16 as each of coefficients in PPS quantization matrices
S703
PPS_QMatrix_PresentFlag == 1 ?
S704
No
Yes
SPS_QMatrix_PresentFlag == 1 ?
S706
Yes
No
Set SPS quantization matrices as PPS quantization matrices
S707
TransformSkipEnableFlag == 1 ?
S708
No
Yes
Decode matrix data of PPS quantization matrices
S705
Set 16 as each of coefficients in 4×4 PPS quantization matrix
S709
Set default matrices as PPS quantization matrices other than 4×4 quantization matrix
S710
Set default matrices as SPS quantization matrices
S711
End

FIG. 13

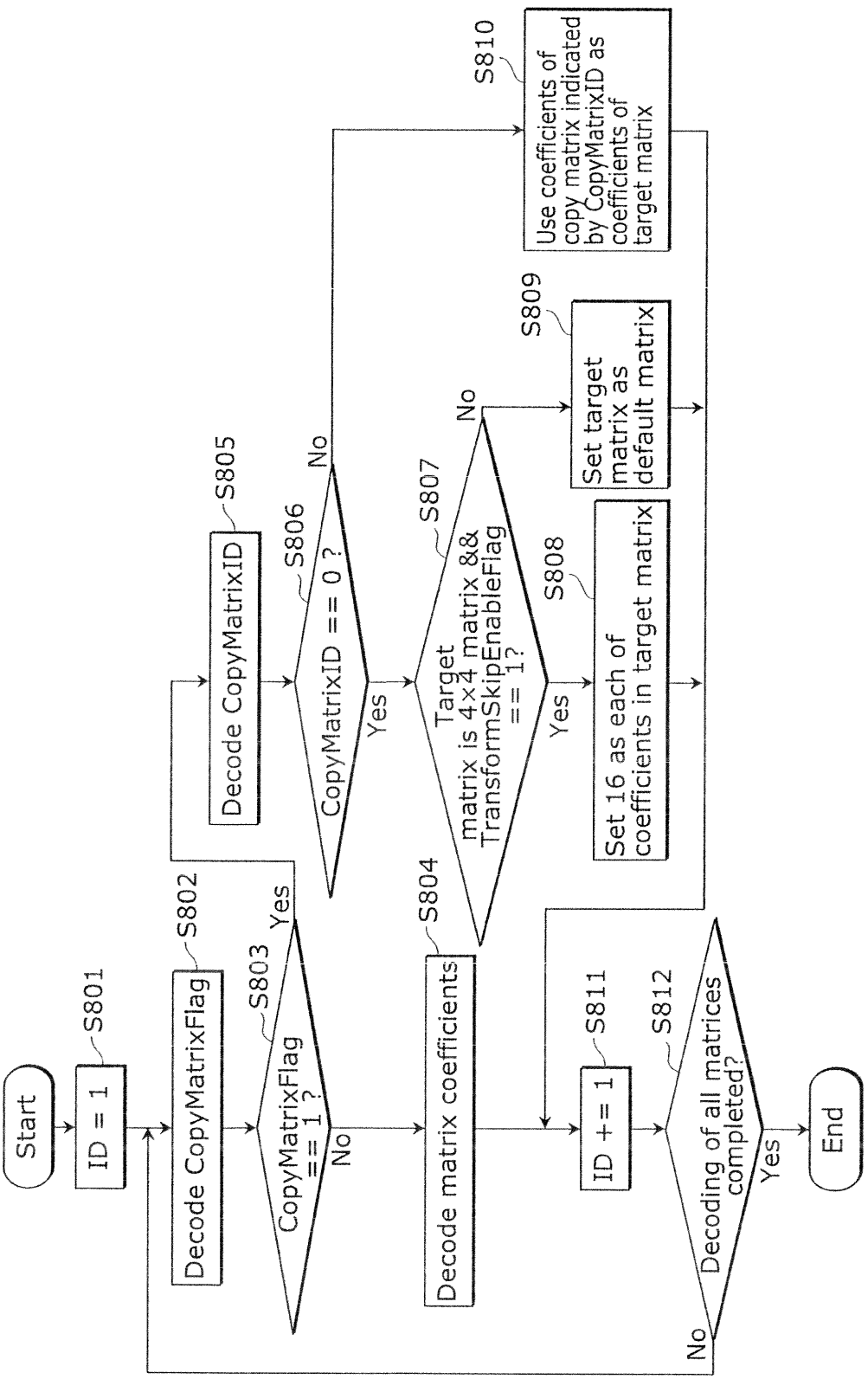

Start
S801
ID = 1
S802
Decode CopyMatrixFlag
S803
CopyMatrixFlag == 1 ?
Yes
No
S804
Decode matrix coefficients
S805
Decode CopyMatrixID
S806
CopyMatrixID == 0 ?
No
Yes
S807
Target matrix is 4×4 matrix && TransformSkipEnableFlag == 1?
No
Yes
S808
Set 16 as each of coefficients in target matrix
S809
Set target matrix as default matrix
S810
Use coefficients of copy matrix indicated by CopyMatrixID as coefficients of target matrix
S811
ID += 1
S812
Decoding of all matrices completed?
No
Yes
End

FIG. 14

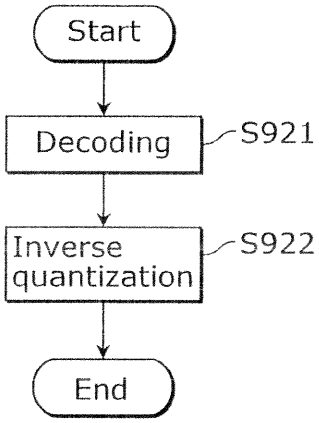


FIG. 15

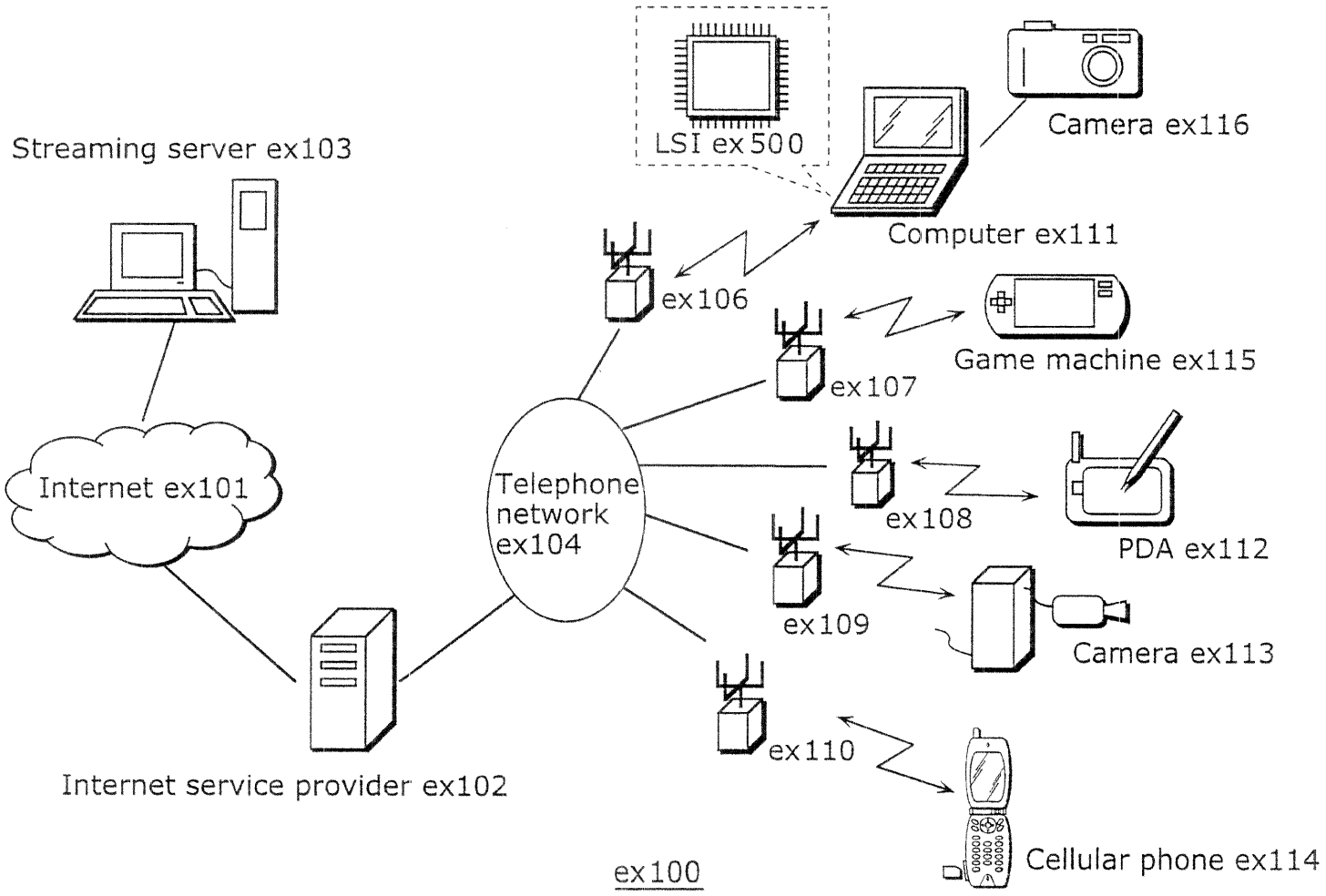

LSI ex500
Camera ex116
Streaming server ex103
Computer ex111
ex106
Game machine ex115
ex107
Internet ex101
Telephone network ex104
ex108
PDA ex112
ex109
Camera ex113
ex110
Internet service provider ex102
Cellular phone ex114
ex100

FIG. 16

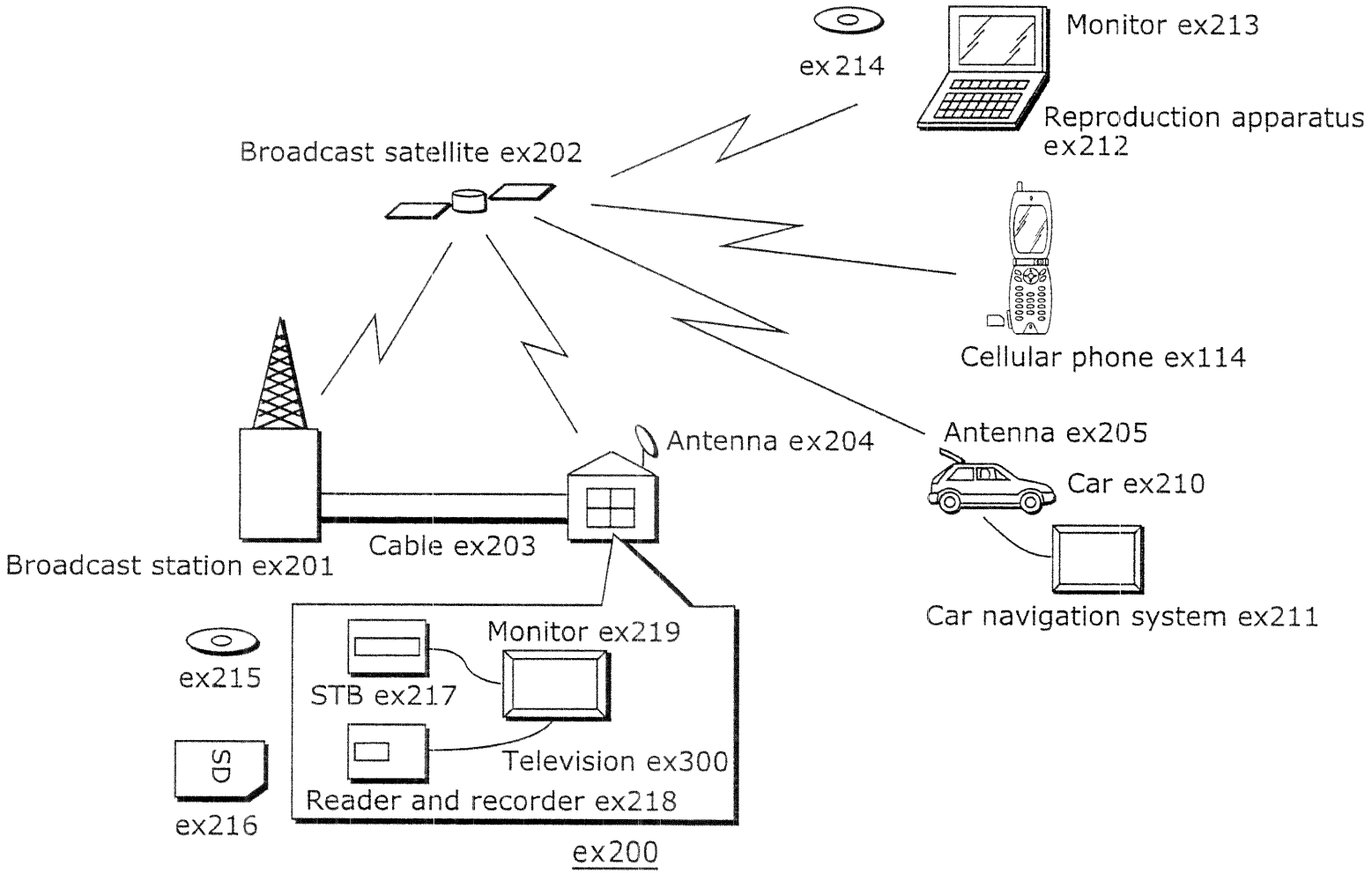

ex214
Monitor ex213
Reproduction apparatus ex212
Broadcast satellite ex202
Cellular phone ex114
Antenna ex204
Antenna ex205
Car ex210
Cable ex203
Broadcast station ex201
Car navigation system ex211
Monitor ex219
ex215
STB ex217
SD
Television ex300
Reader and recorder ex218
ex216
ex200

FIG. 17

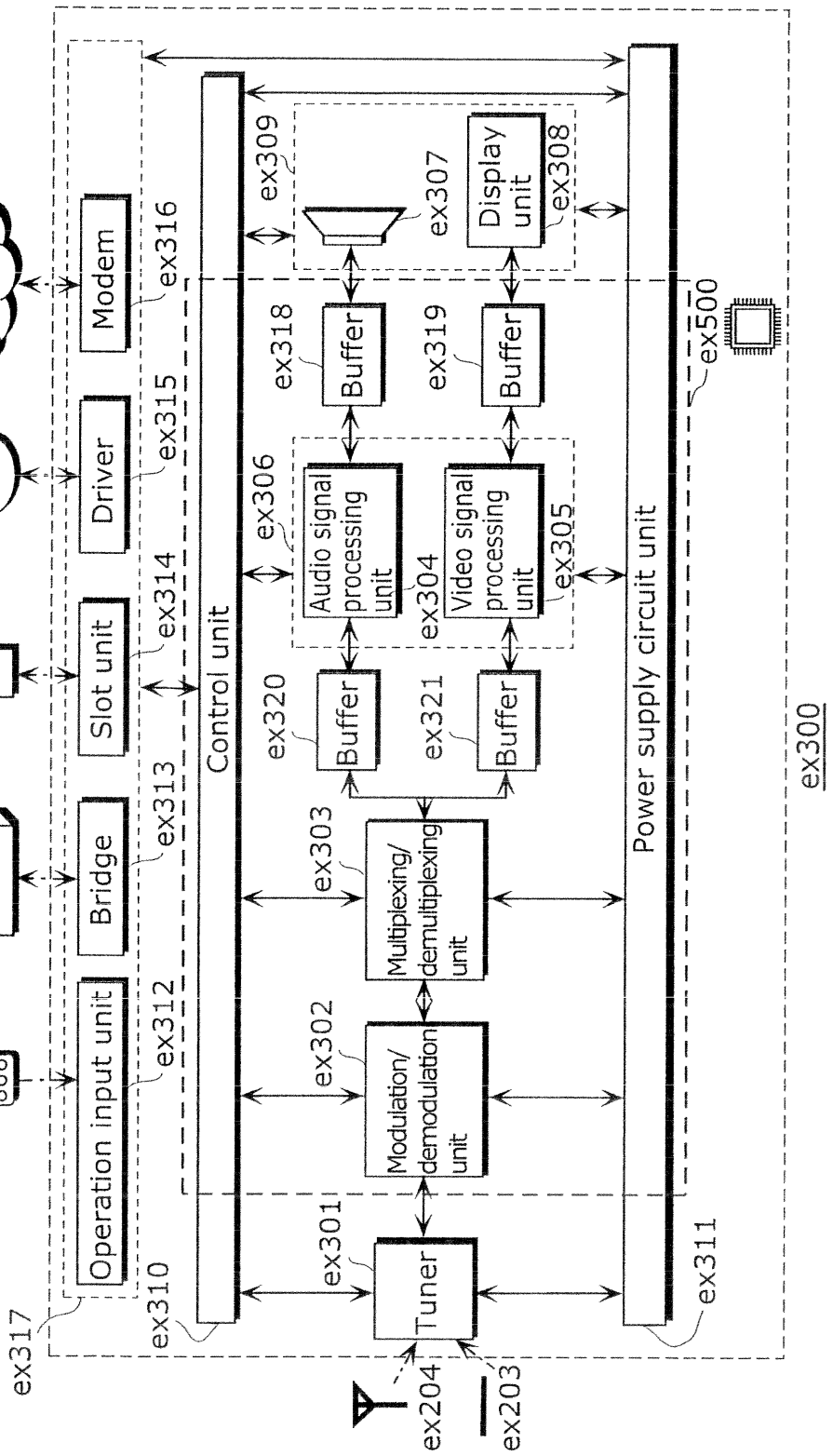

ex104
Telephone network
ex215
ex216
SD
ex218
ex220
ex317
Operation input unit
ex312
Bridge
ex313
Slot unit
ex314
Driver
ex315
Modem
ex316
Control unit
ex310
ex309
ex307
Display unit
ex308
ex318
Buffer
ex319
Buffer
ex306
Audio signal processing unit
ex304
Video signal processing unit
ex305
ex320
Buffer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

FIG. 18

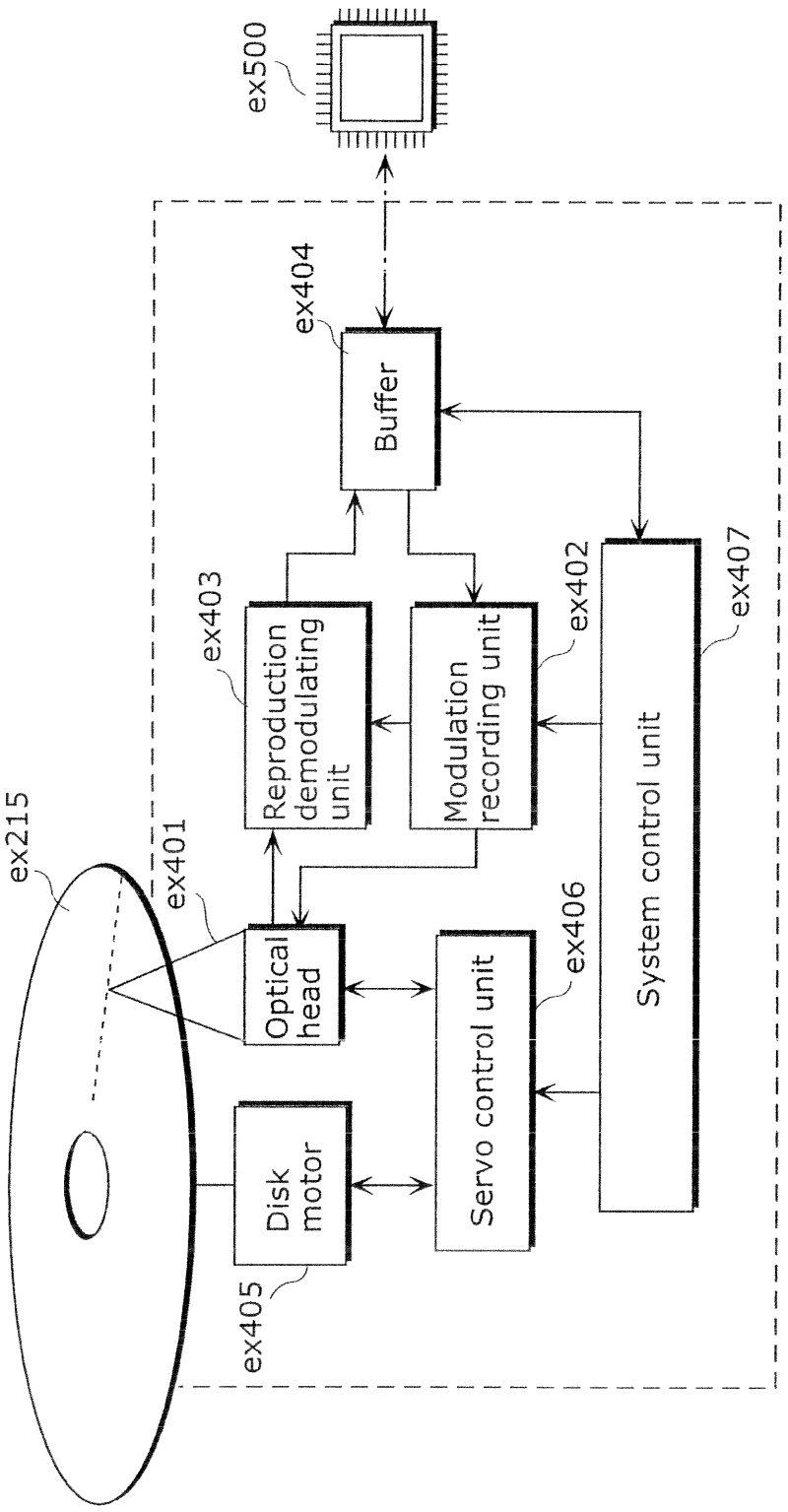

ex500
ex404
Buffer
ex403
Reproduction demodulating unit
ex402
Modulation recording unit
ex407
System control unit
ex215
ex401
Optical head
ex406
Servo control unit
Disk motor
ex405
ex400

FIG. 19

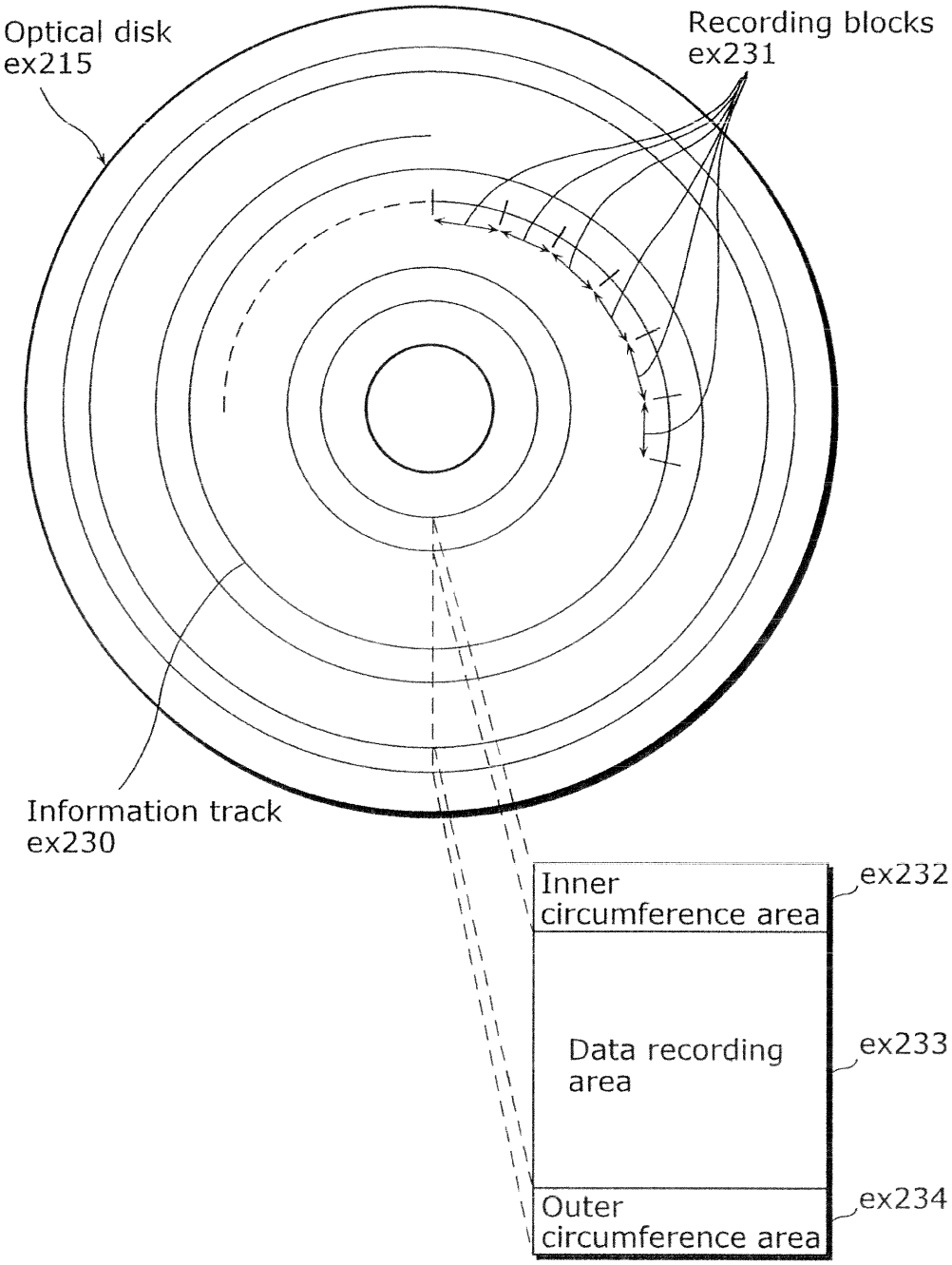

Optical disk
ex215
Recording blocks
ex231
Information track
ex230
Inner
circumference area
ex232
Data recording
area
ex233
Outer
circumference area
ex234

FIG. 20A

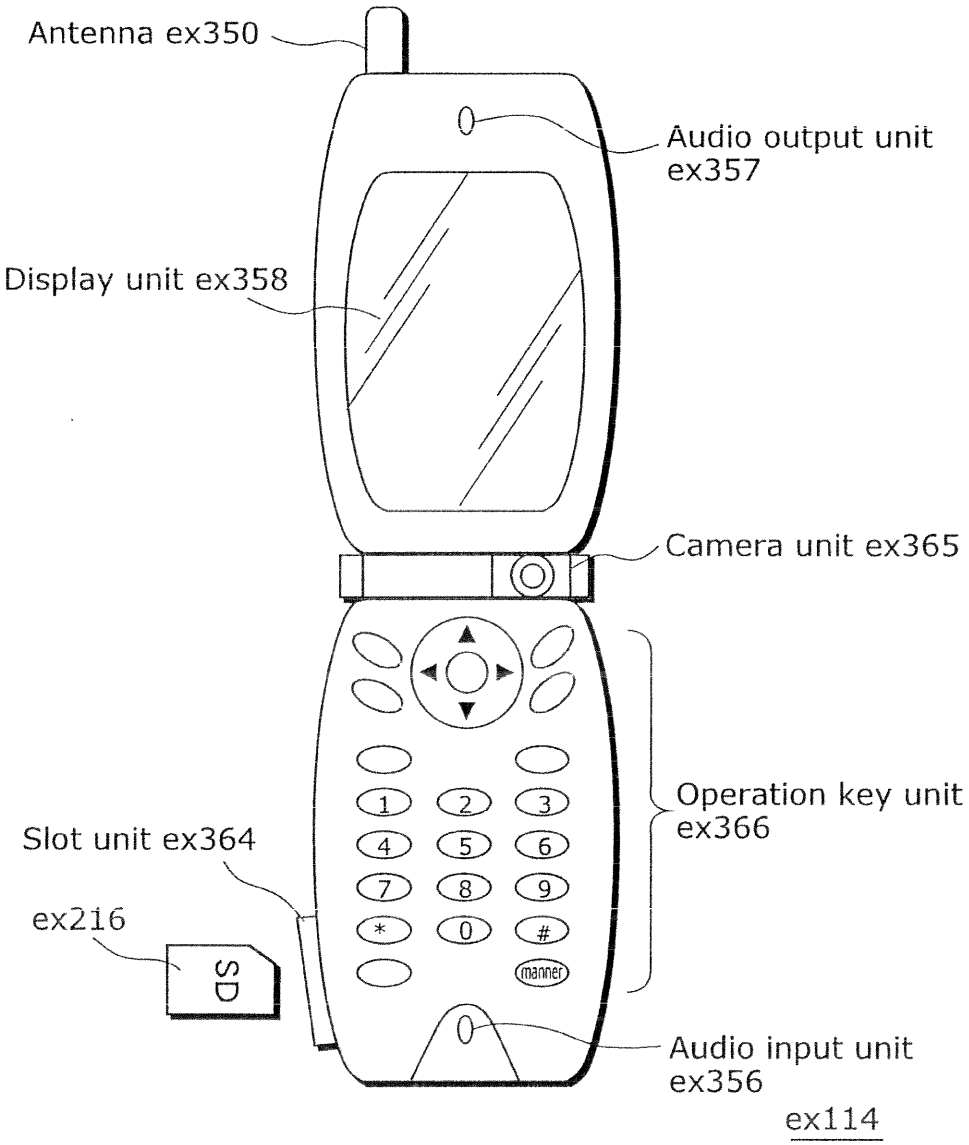

Antenna ex350
Audio output unit ex357
Display unit ex358
Camera unit ex365
Operation key unit ex366
Slot unit ex364
ex216
SD
Audio input unit ex356
ex114

FIG. 20B

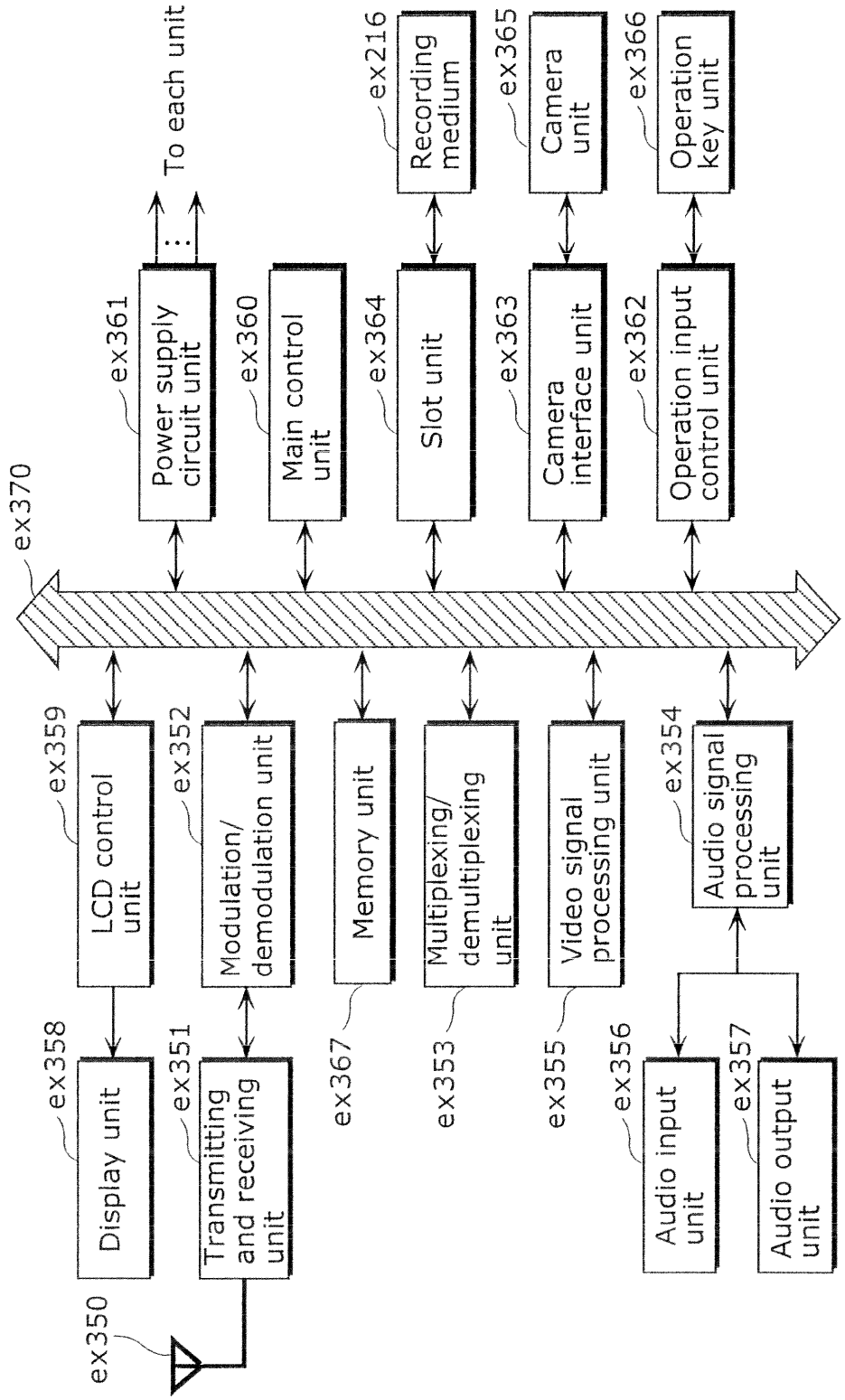

ex370
ex361
Power supply circuit unit
To each unit
ex360
Main control unit
ex364
Slot unit
ex216
Recording medium
ex363
Camera interface unit
ex365
Camera unit
ex362
Operation input control unit
ex366
Operation key unit
ex359
LCD control unit
ex352
Modulation/ demodulation unit
Memory unit
Multiplexing/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

FIG. 21

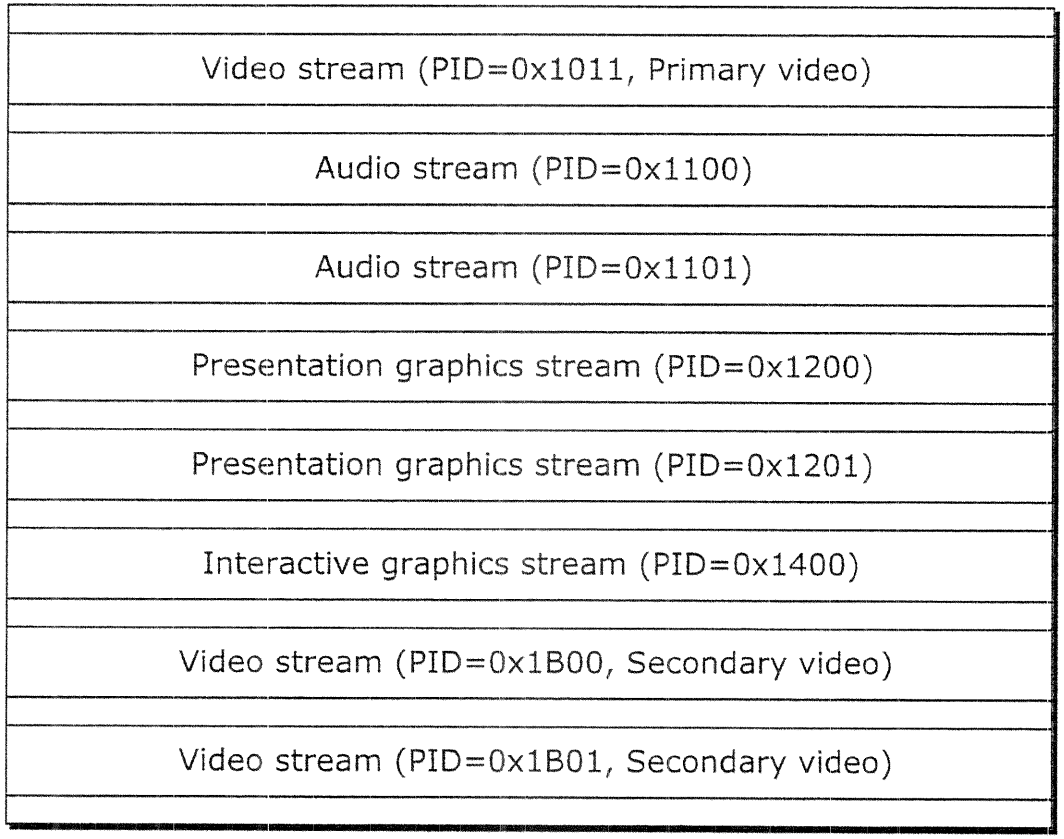

Video stream (PID=0x1011, Primary video)
Audio stream (PID=0x1100)
Audio stream (PID=0x1101)
Presentation graphics stream (PID=0x1200)
Presentation graphics stream (PID=0x1201)
Interactive graphics stream (PID=0x1400)
Video stream (PID=0x1B00, Secondary video)
Video stream (PID=0x1B01, Secondary video)

FIG. 22

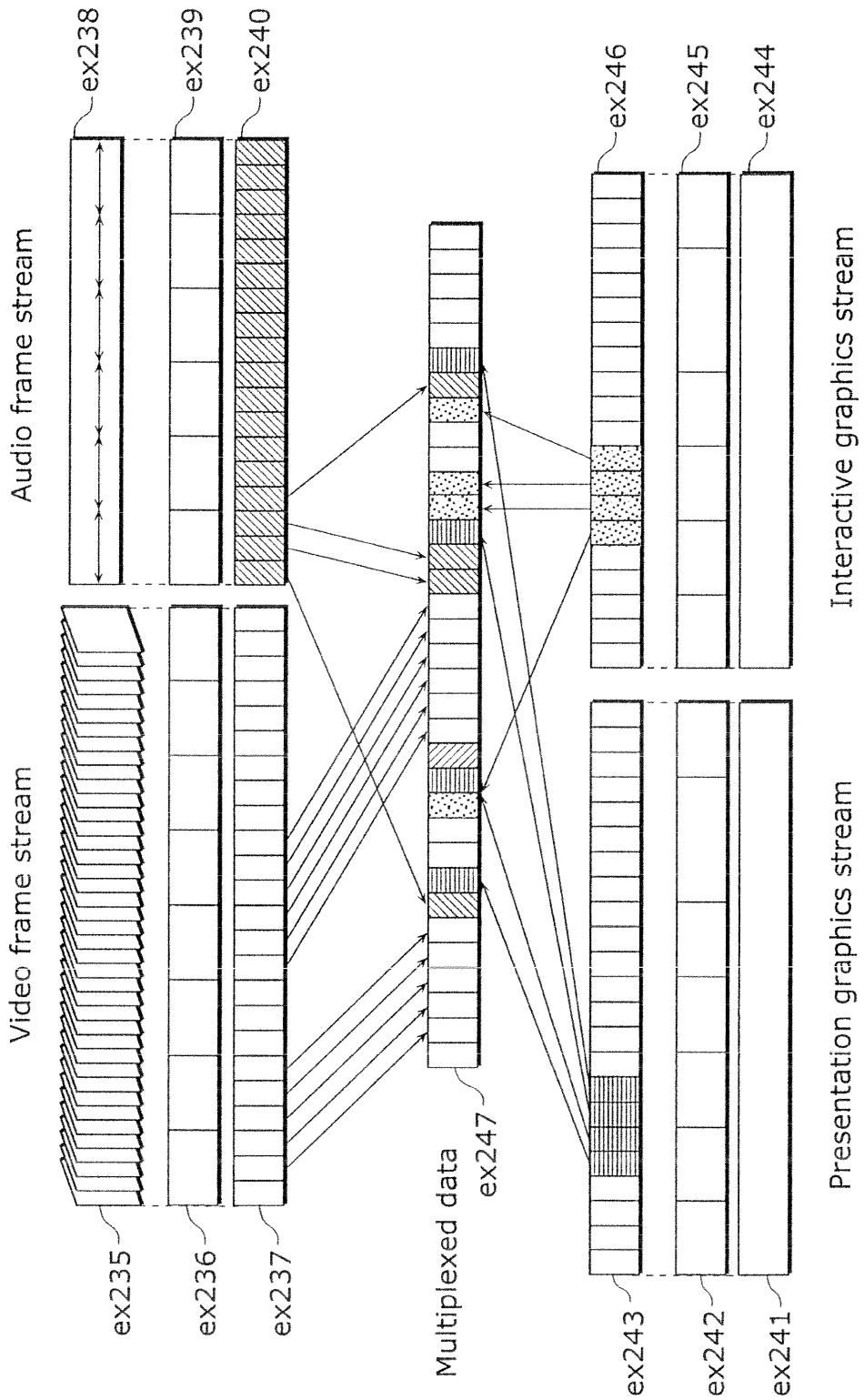

Video frame stream
Audio frame stream
Interactive graphics stream
Presentation graphics stream
Multiplexed data
ex235
ex236
ex237
ex238
ex239
ex240
ex241
ex242
ex243
ex244
ex245
ex246
ex247

FIG. 23

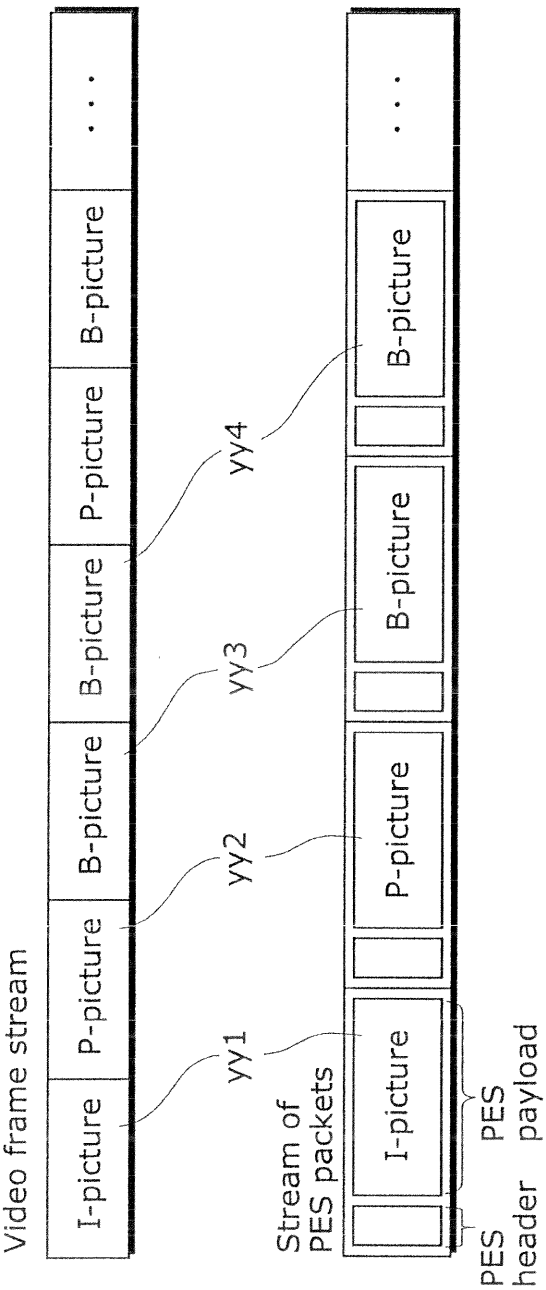
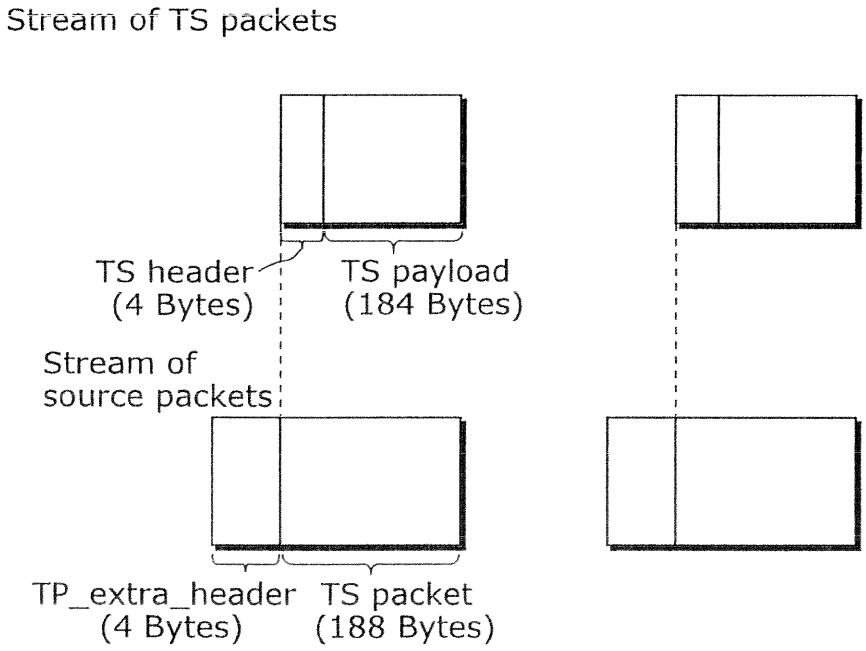

Video frame stream
I-picture
P-picture
B-picture
B-picture
P-picture
B-picture
. . .
yy1
yy2
yy3
yy4
Stream of PES packets
I-picture
P-picture
B-picture
B-picture
. . .
PES header
PES payload

FIG. 24


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)

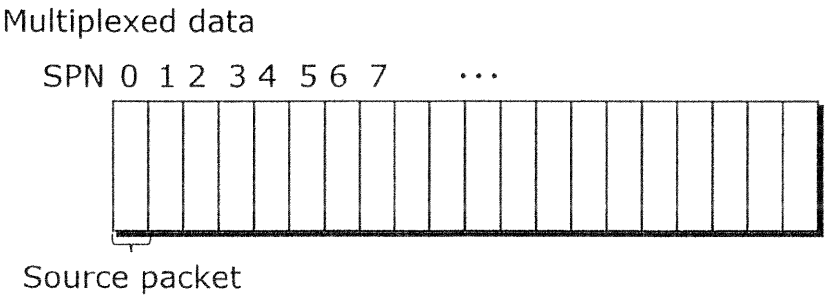

Multiplexed data
SPN 0 1 2 3 4 5 6 7 ...
Source packet

FIG. 25

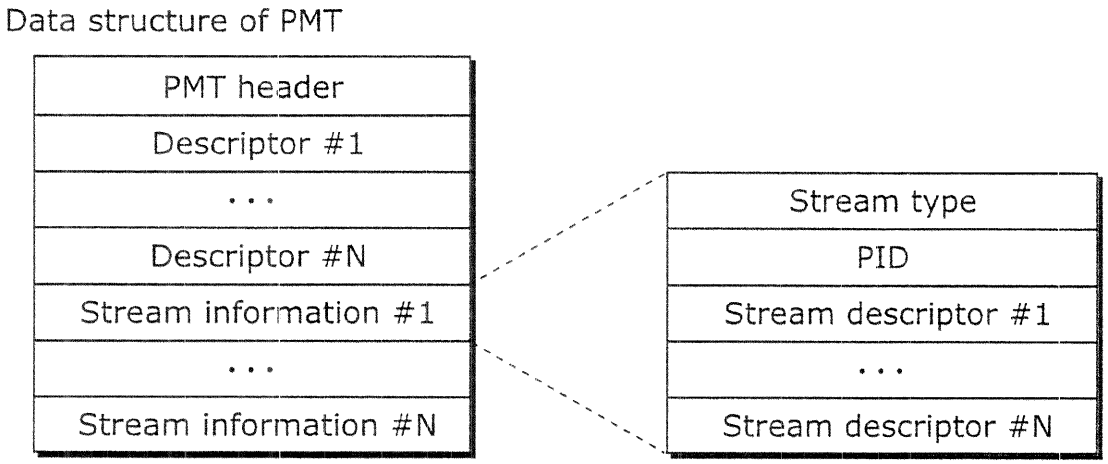

Data structure of PMT
PMT header
Descriptor #1
...
Descriptor #N
Stream information #1
...
Stream information #N
Stream type
PID
Stream descriptor #1
...
Stream descriptor #N

FIG. 26

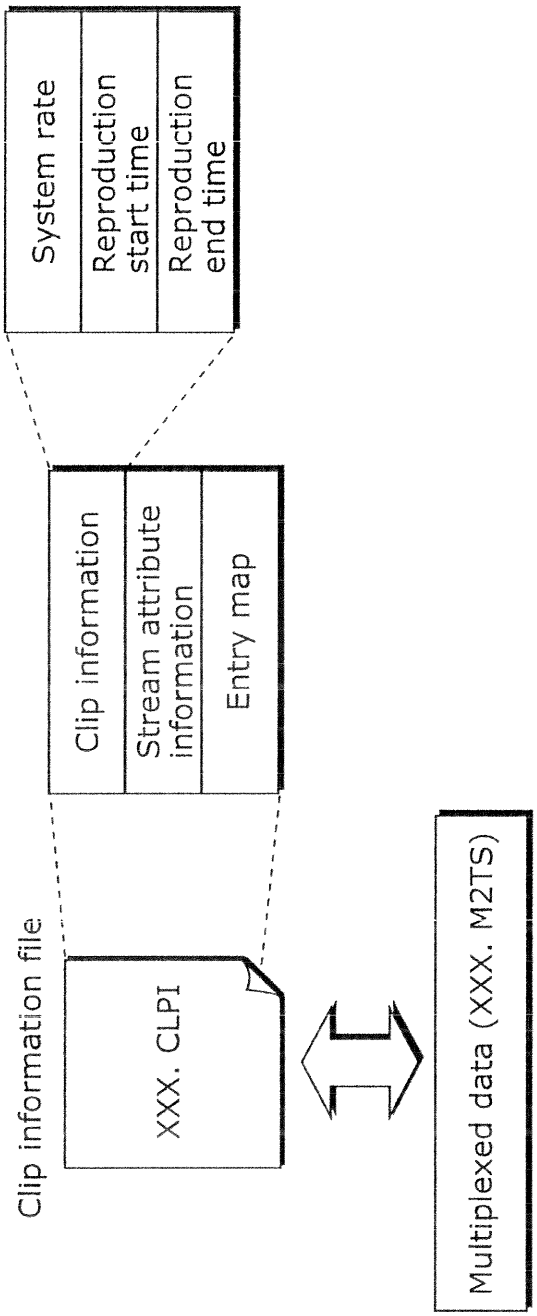

System rate
Reproduction start time
Reproduction end time
Clip information
Stream attribute information
Entry map
Clip information file
XXX. CLPI
Multiplexed data (XXX. M2TS)

FIG. 27

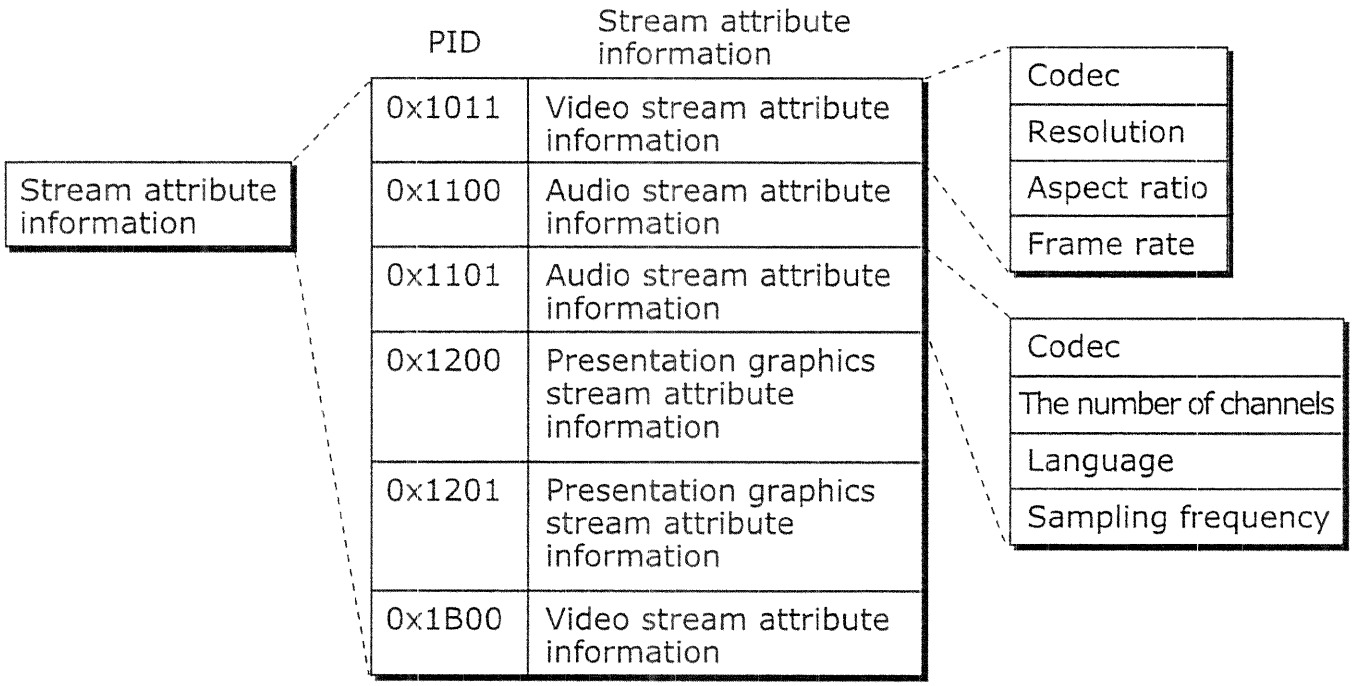

Stream attribute information
PID
Stream attribute information
0x1011
Video stream attribute information
0x1100
Audio stream attribute information
0x1101
Audio stream attribute information
0x1200
Presentation graphics stream attribute information
0x1201
Presentation graphics stream attribute information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

FIG. 28

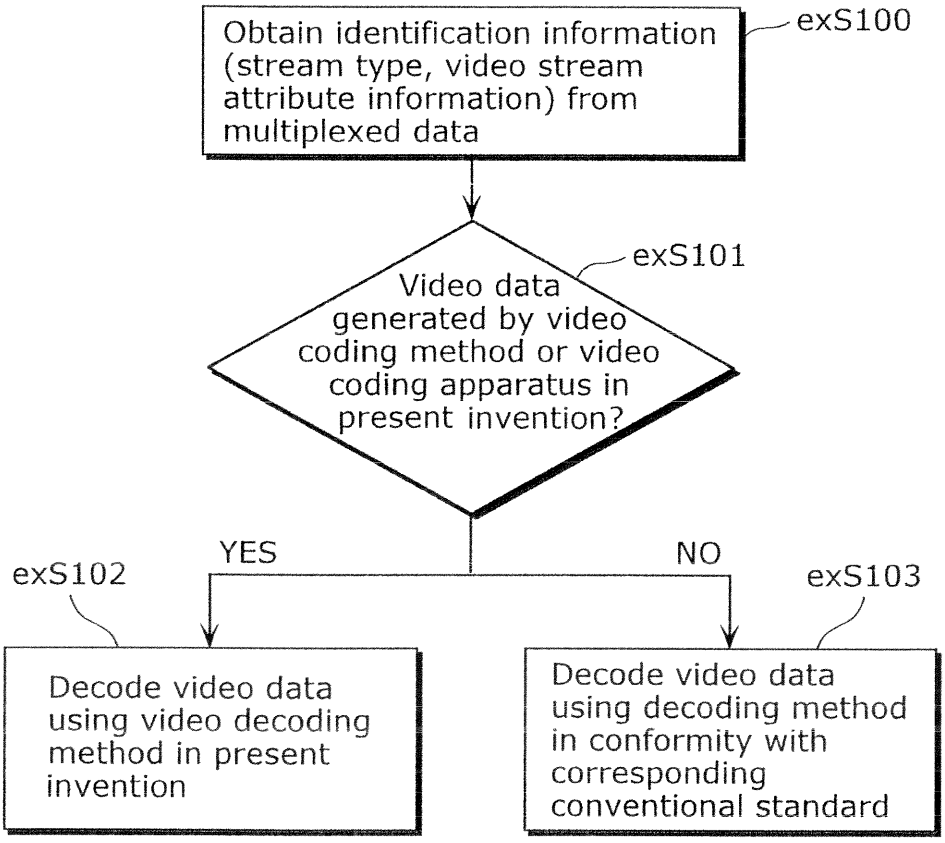

Obtain identification information (stream type, video stream attribute information) from multiplexed data
exS100
Video data generated by video coding method or video coding apparatus in present invention?
exS101
YES
NO
exS102
exS103
Decode video data using video decoding method in present invention
Decode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

FIG. 29

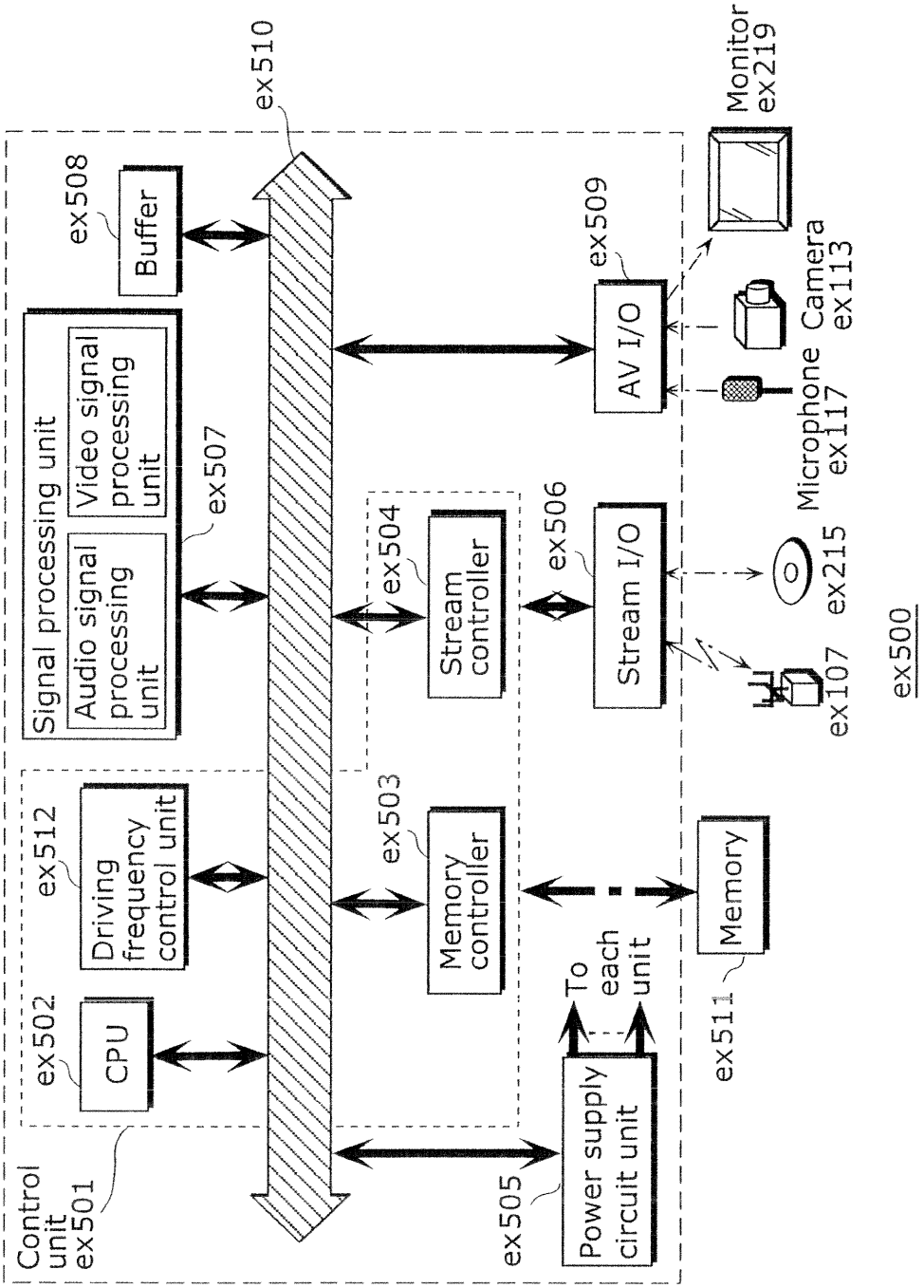
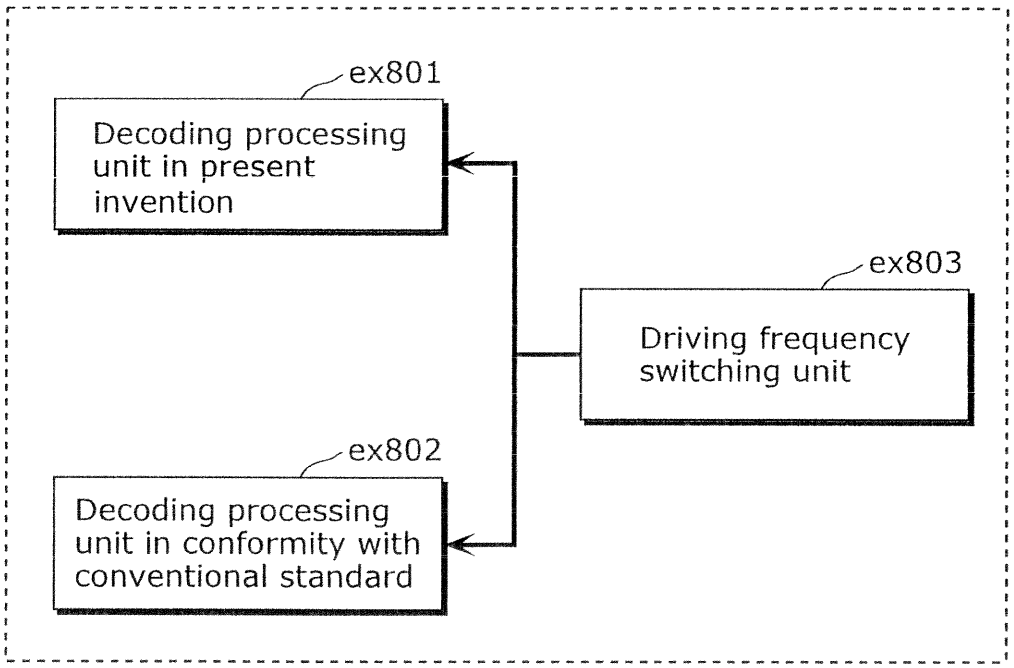

Control unit ex501
CPU ex502
Driving frequency control unit ex512
Signal processing unit
Audio signal processing unit
Video signal processing unit ex507
Buffer ex508
Power supply circuit unit ex505
To each unit
Memory controller ex503
Stream controller ex504
Stream I/O ex506
Memory ex511
AV I/O ex509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

FIG. 30


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

ex800

FIG. 31

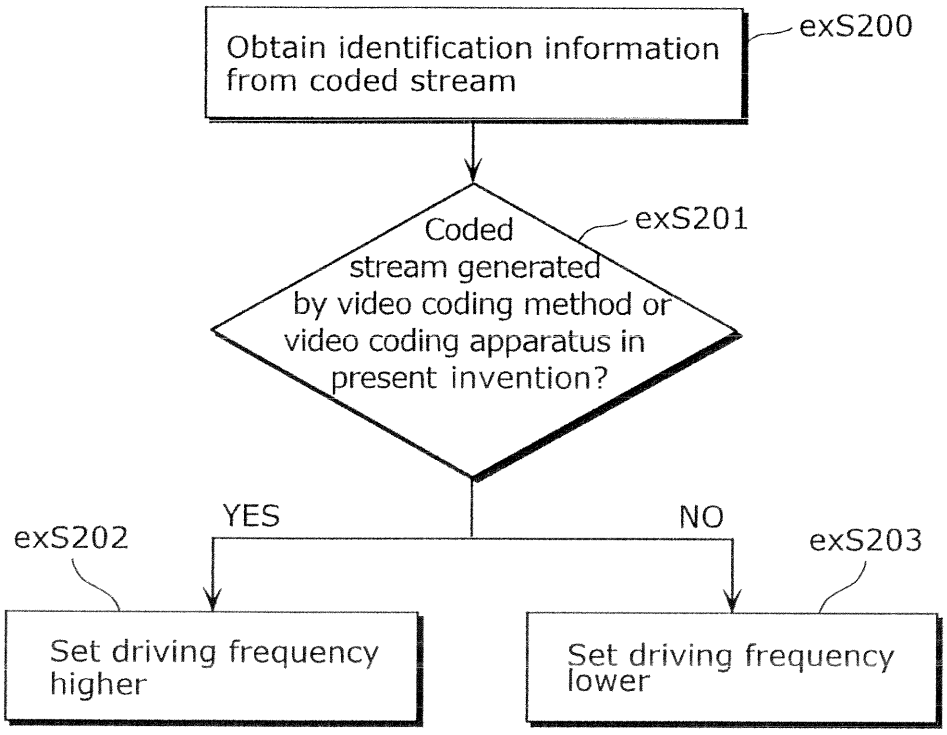

Obtain identification information from coded stream
exS200
Coded stream generated by video coding method or video coding apparatus in present invention?
exS201
YES
NO
exS202
exS203
Set driving frequency higher
Set driving frequency lower

FIG. 32

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

FIG. 33A

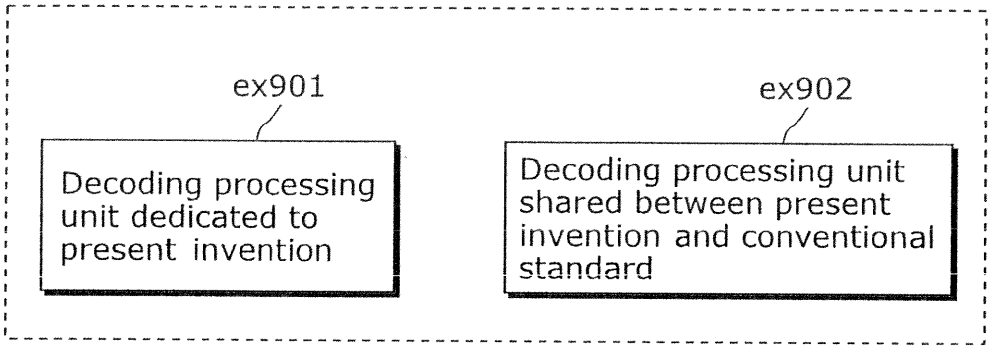
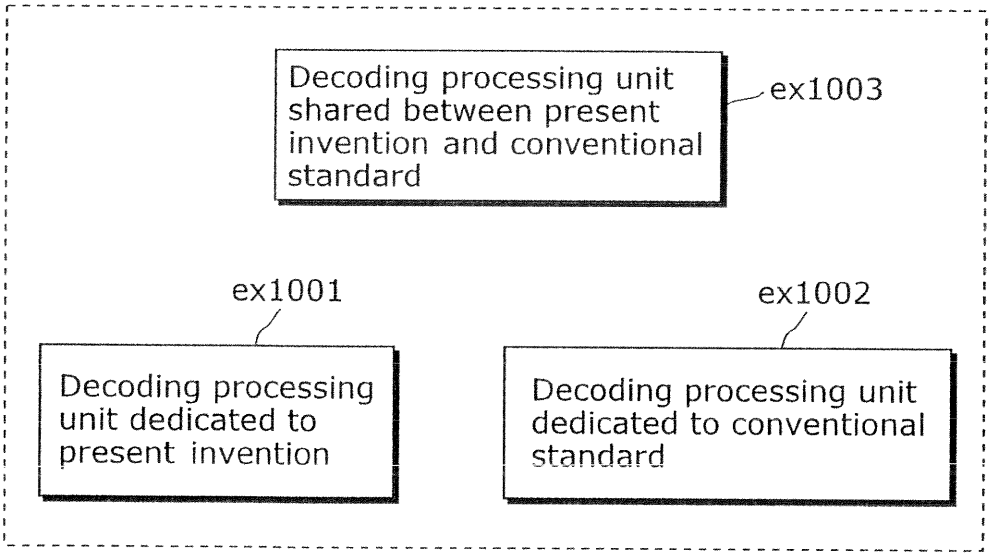



FIG. 33B