FIG. 1

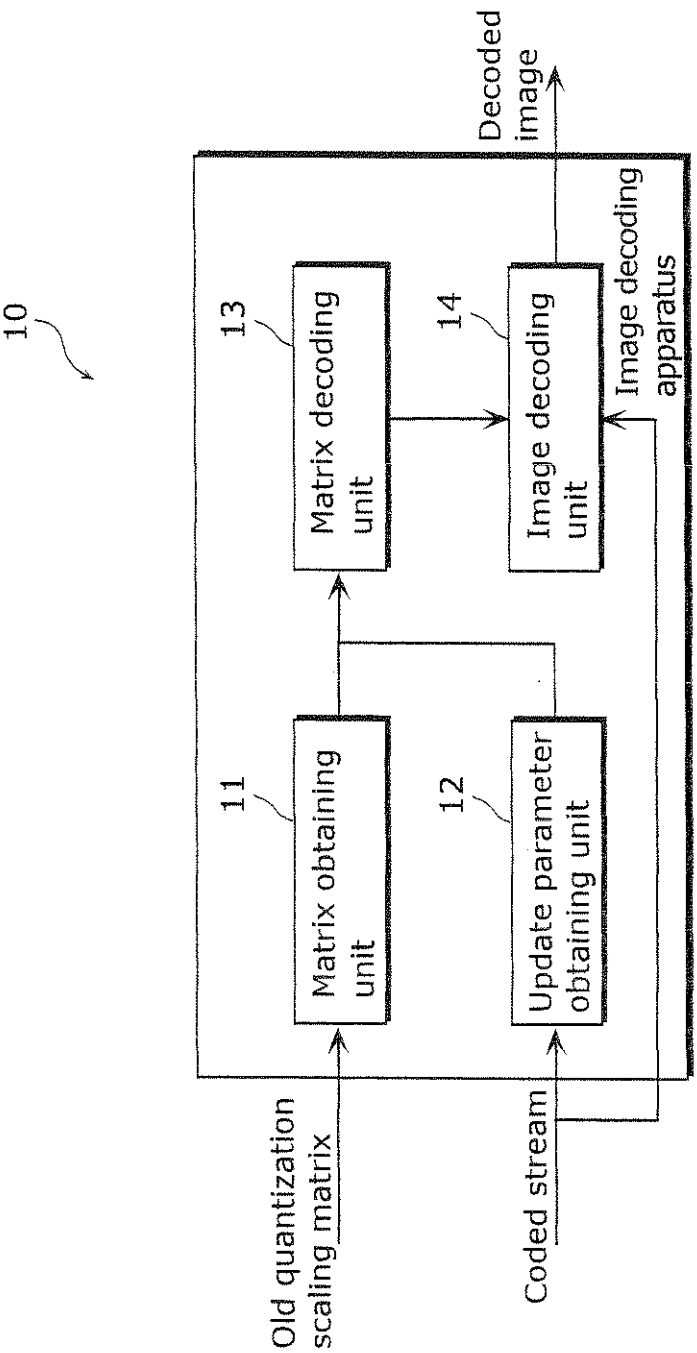

10
Image decoding apparatus
Old quantization scaling matrix
Coded stream
Decoded image
11
Matrix obtaining unit
12
Update parameter obtaining unit
13
Matrix decoding unit
14
Image decoding unit

FIG. 2

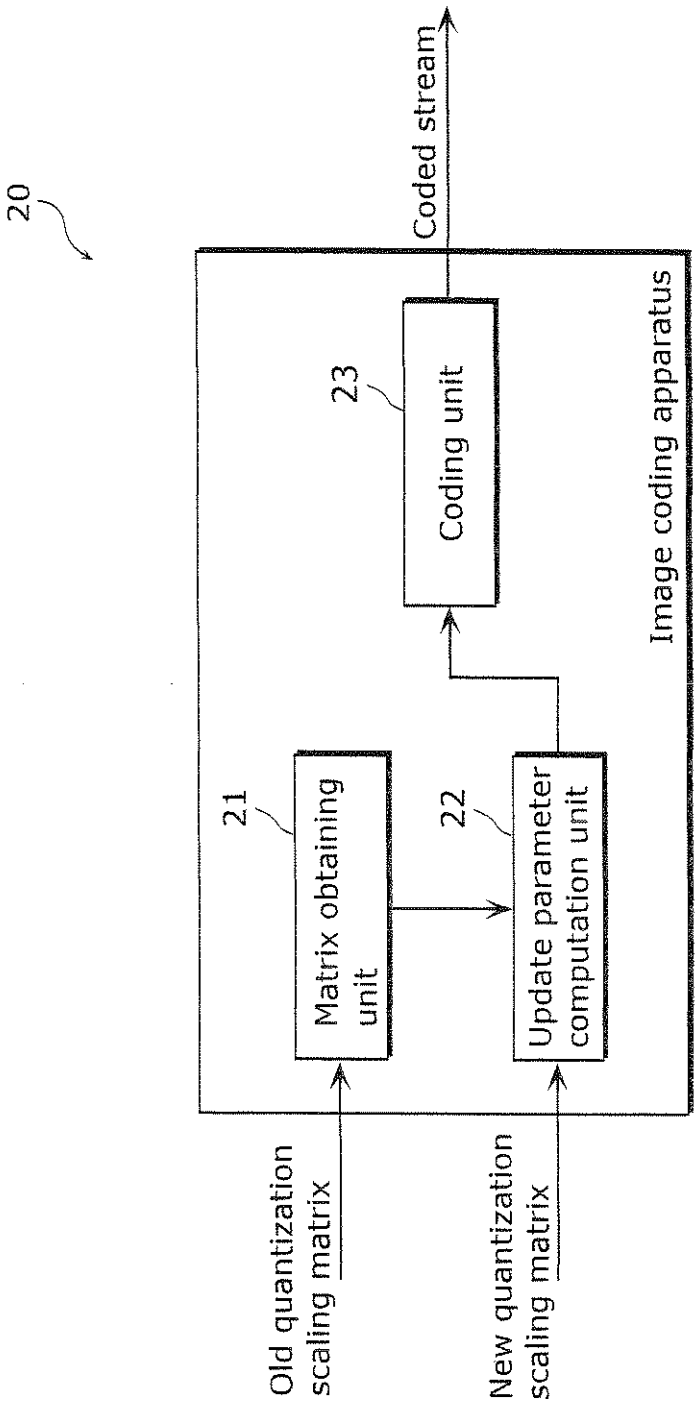

20
Coded stream
23
Coding unit
Image coding apparatus
21
Matrix obtaining unit
22
Update parameter computation unit
Old quantization scaling matrix
New quantization scaling matrix

FIG. 3

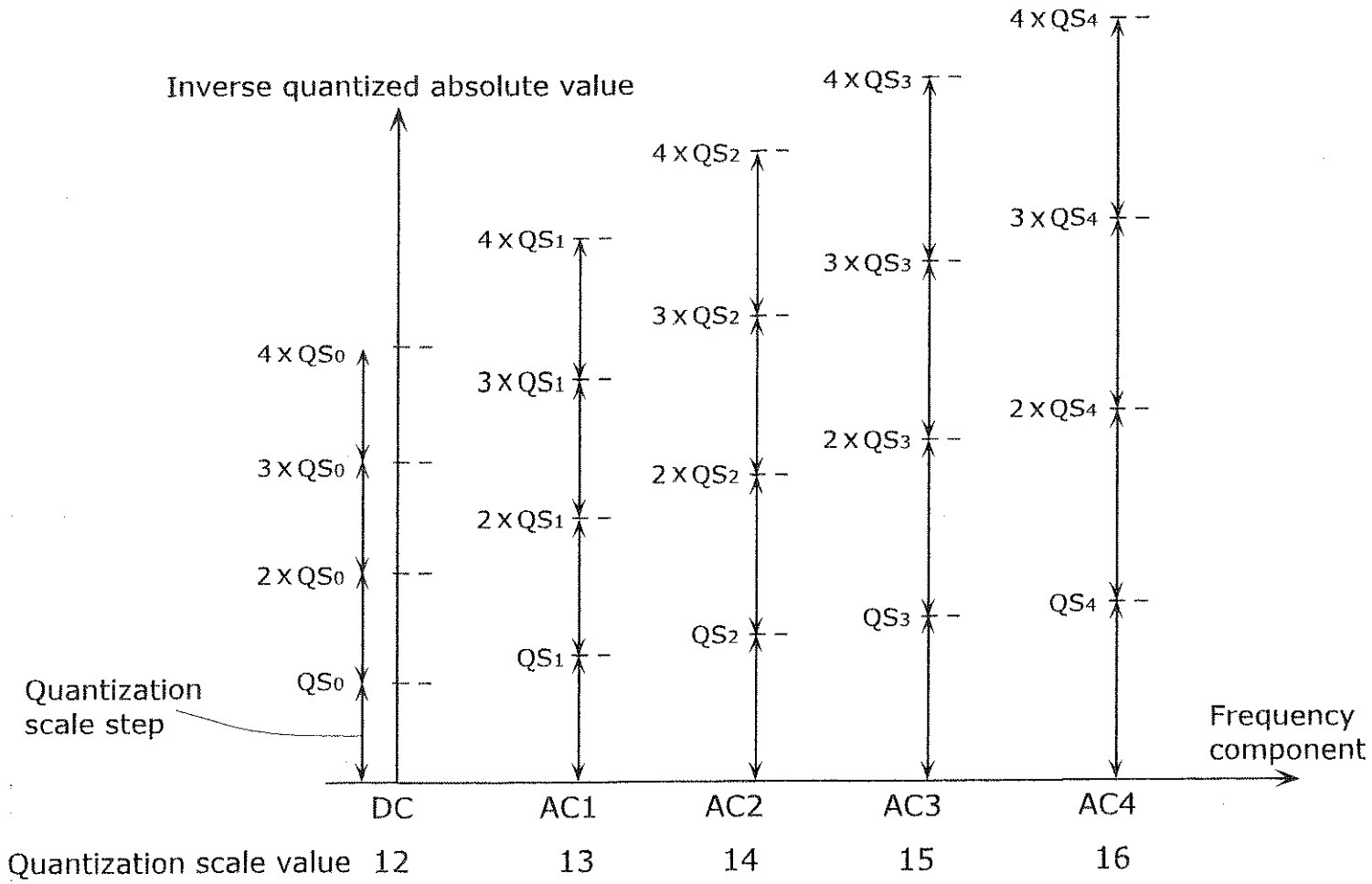

Inverse quantized absolute value
4 x QS0
3 x QS0
2 x QS0
QS0
4 x QS1
3 x QS1
2 x QS1
QS1
4 x QS2
3 x QS2
2 x QS2
QS2
4 x QS3
3 x QS3
2 x QS3
QS3
4 x QS4
3 x QS4
2 x QS4
QS4
Quantization scale step
Frequency component
DC
AC1
AC2
AC3
AC4
Quantization scale value 12
13
14
15
16

FIG. 4A

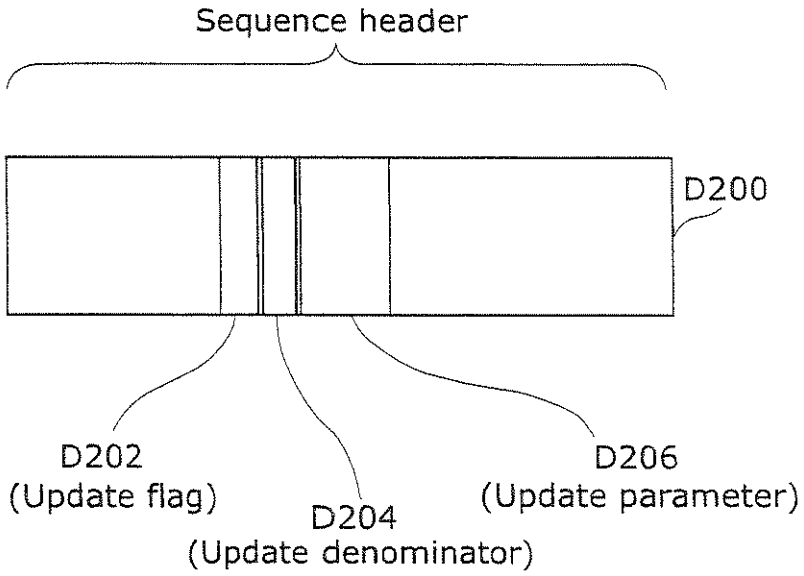

Sequence header
D200
D202
(Update flag)
D204
(Update denominator)
D206
(Update parameter)

FIG. 4B

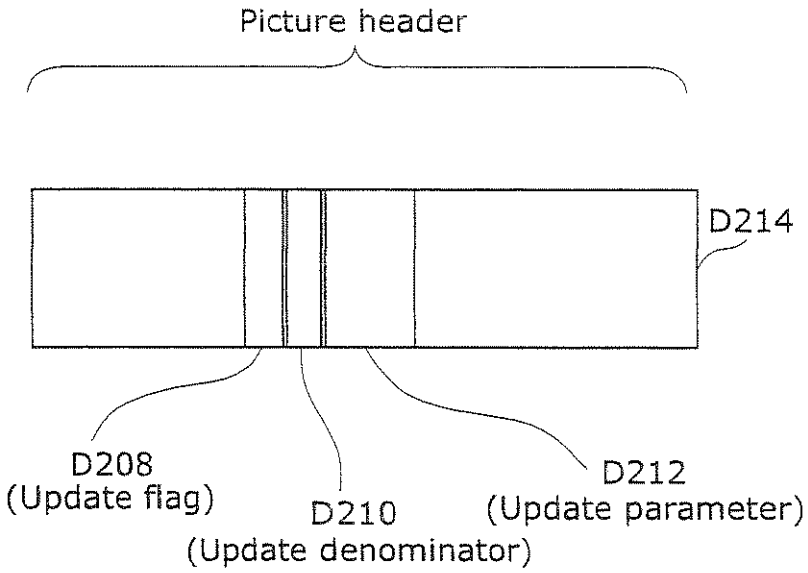

Picture header
D214
D208
(Update flag)
D210
(Update denominator)
D212
(Update parameter)

FIG. 5

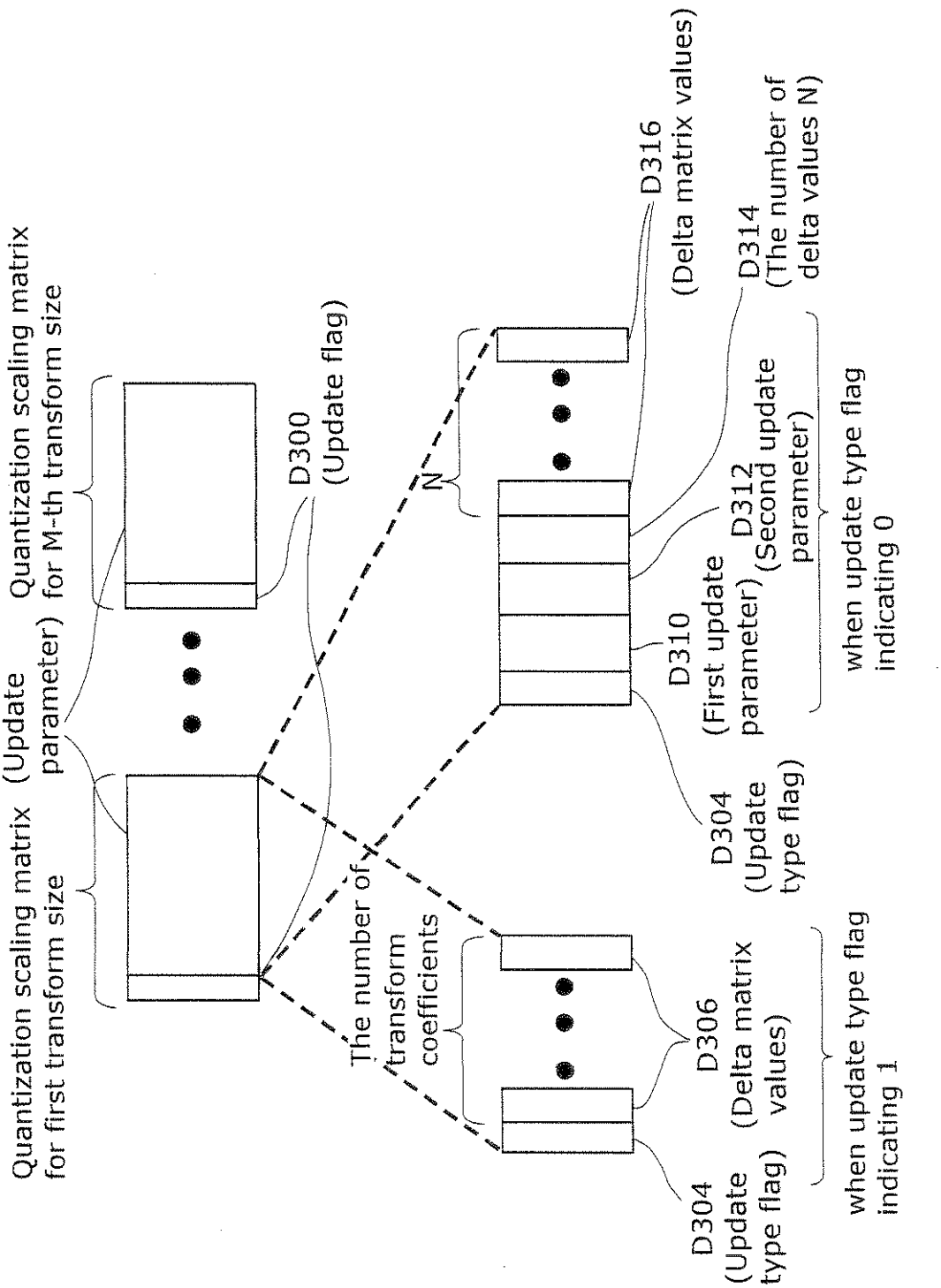

D302
(Update parameter)
Quantization scaling matrix for first transform size
Quantization scaling matrix for M-th transform size
D300
(Update flag)
The number of transform coefficients
N
D304
(Update type flag)
D306
(Delta matrix values)
when update type flag indicating 1
D304
(Update type flag)
D310
(First update parameter)
D312
(Second update parameter)
D314
(The number of delta values N)
D316
(Delta matrix values)
when update type flag indicating 0

FIG. 6

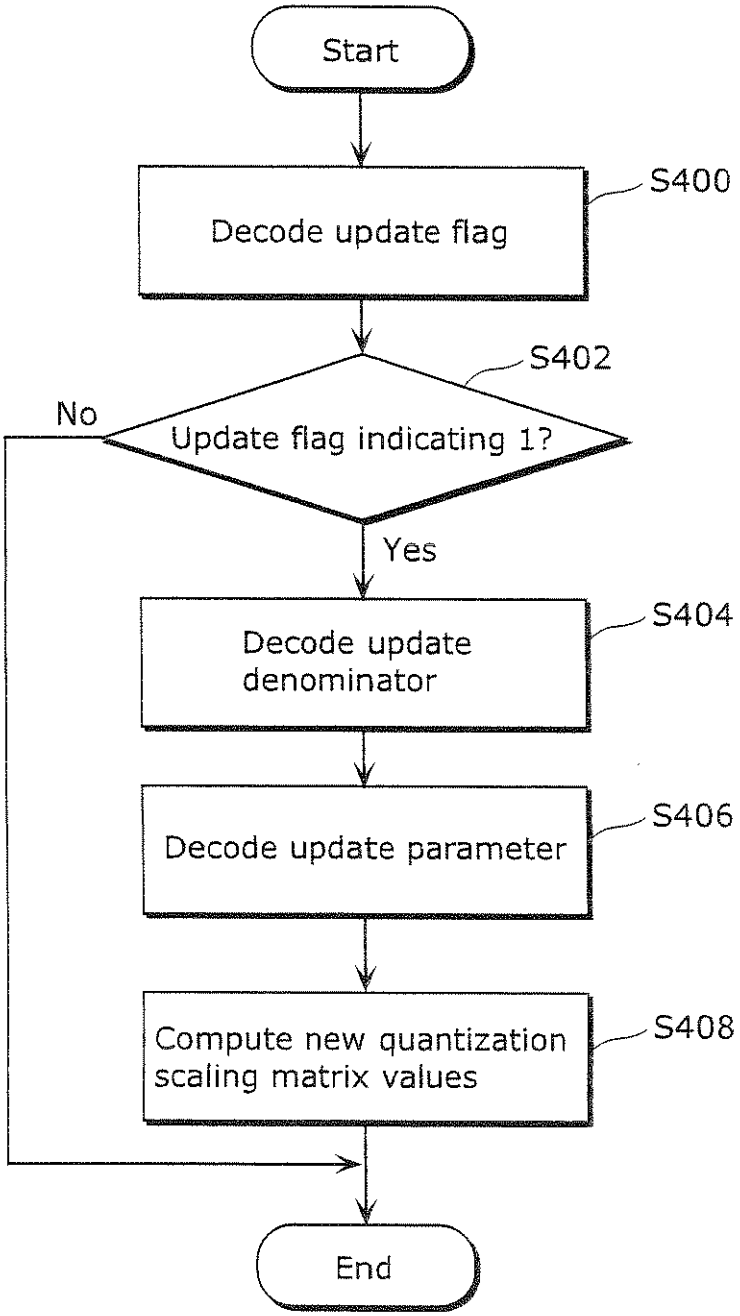

Start
Decode update flag
S400
S402
No
Update flag indicating 1?
Yes
Decode update denominator
S404
Decode update parameter
S406
Compute new quantization scaling matrix values
S408
End

FIG. 7

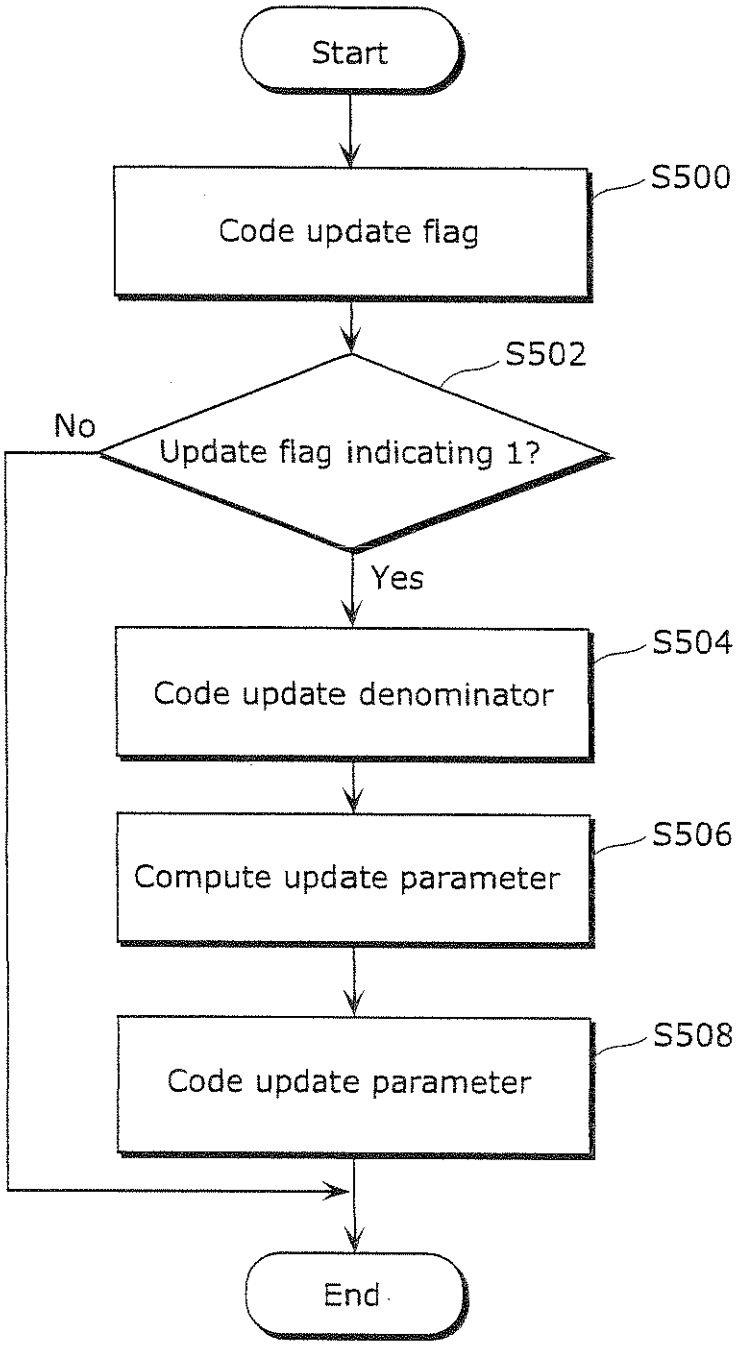

Start
Code update flag
S500
S502
No
Update flag indicating 1?
Yes
Code update denominator
S504
Compute update parameter
S506
Code update parameter
S508
End

FIG. 8

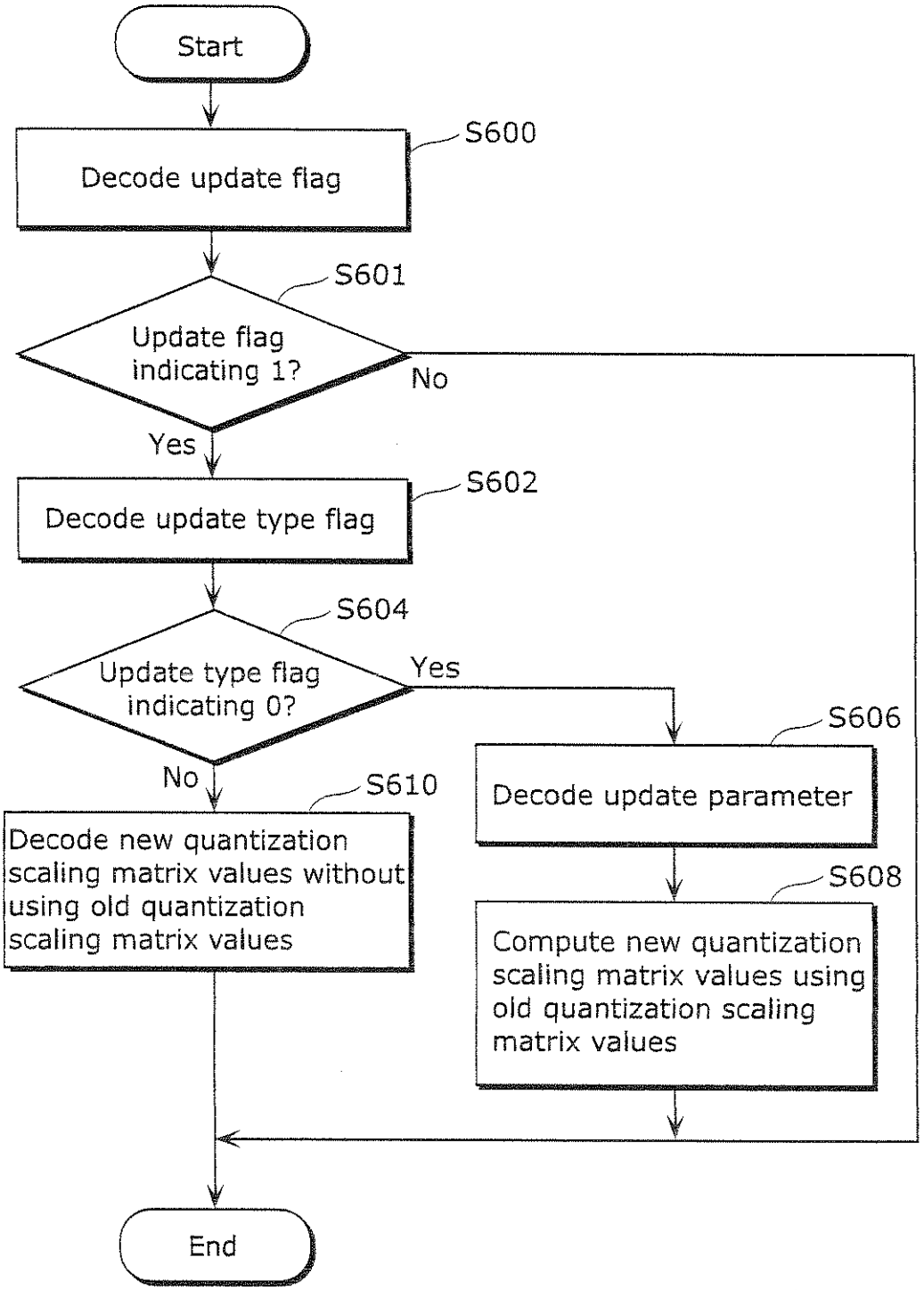

Start
Decode update flag
S600
S601
Update flag indicating 1?
No
Yes
Decode update type flag
S602
S604
Update type flag indicating 0?
Yes
S606
Decode update parameter
S608
Compute new quantization scaling matrix values using old quantization scaling matrix values
No
S610
Decode new quantization scaling matrix values without using old quantization scaling matrix values
End

FIG. 9

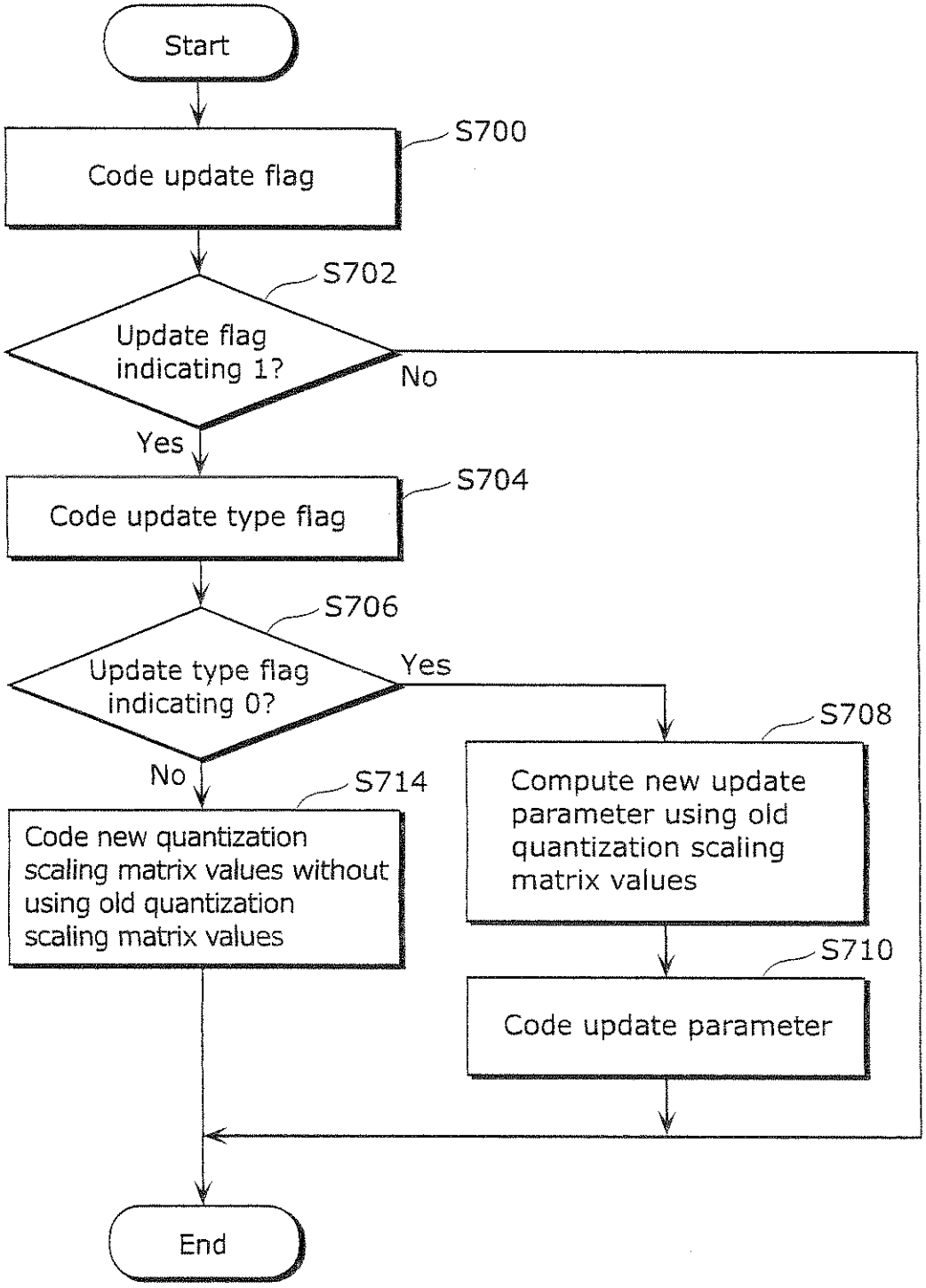

Start
Code update flag
S700
S702
Update flag indicating 1?
No
Yes
Code update type flag
S704
S706
Update type flag indicating 0?
Yes
S708
No
S714
Code new quantization scaling matrix values without using old quantization scaling matrix values
Compute new update parameter using old quantization scaling matrix values
S710
Code update parameter
End

FIG. 10

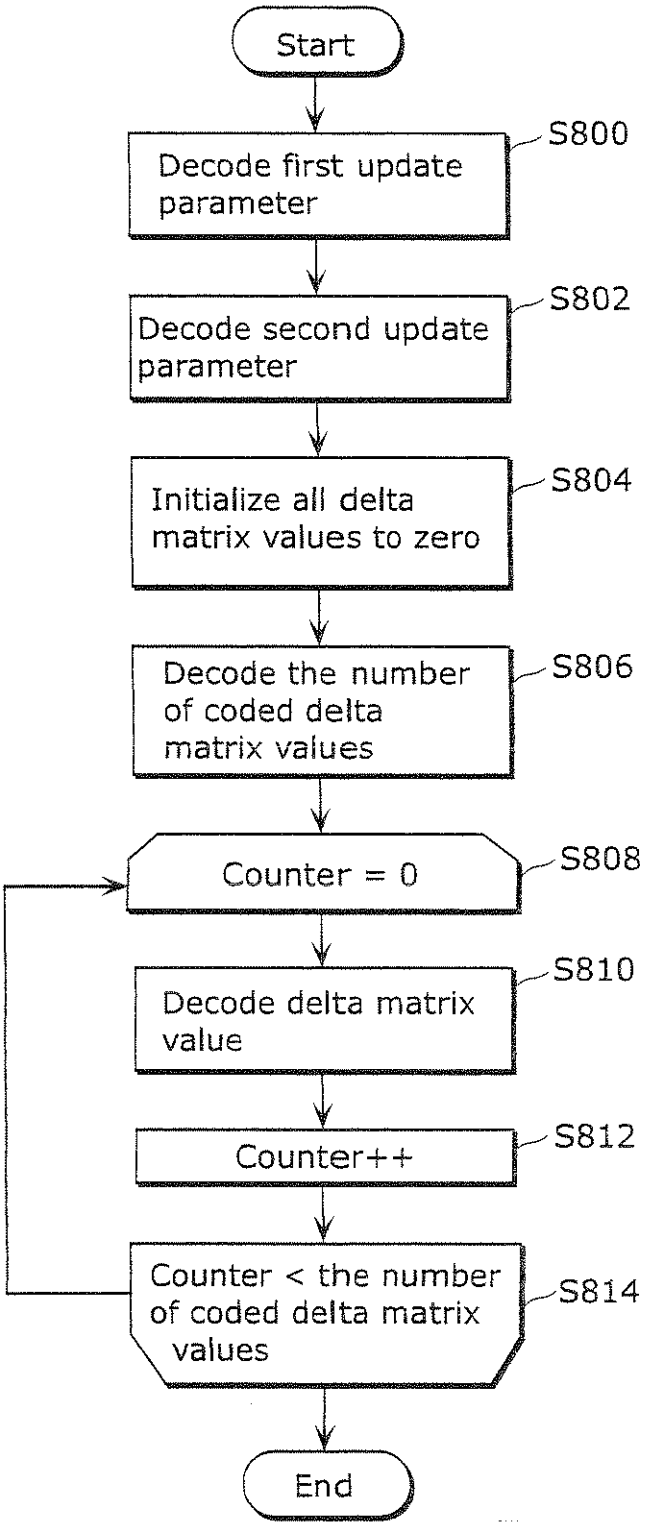

Start
Decode first update parameter
S800
Decode second update parameter
S802
Initialize all delta matrix values to zero
S804
Decode the number of coded delta matrix values
S806
Counter = 0
S808
Decode delta matrix value
S810
Counter++
S812
Counter < the number of coded delta matrix values
S814
End

FIG. 11

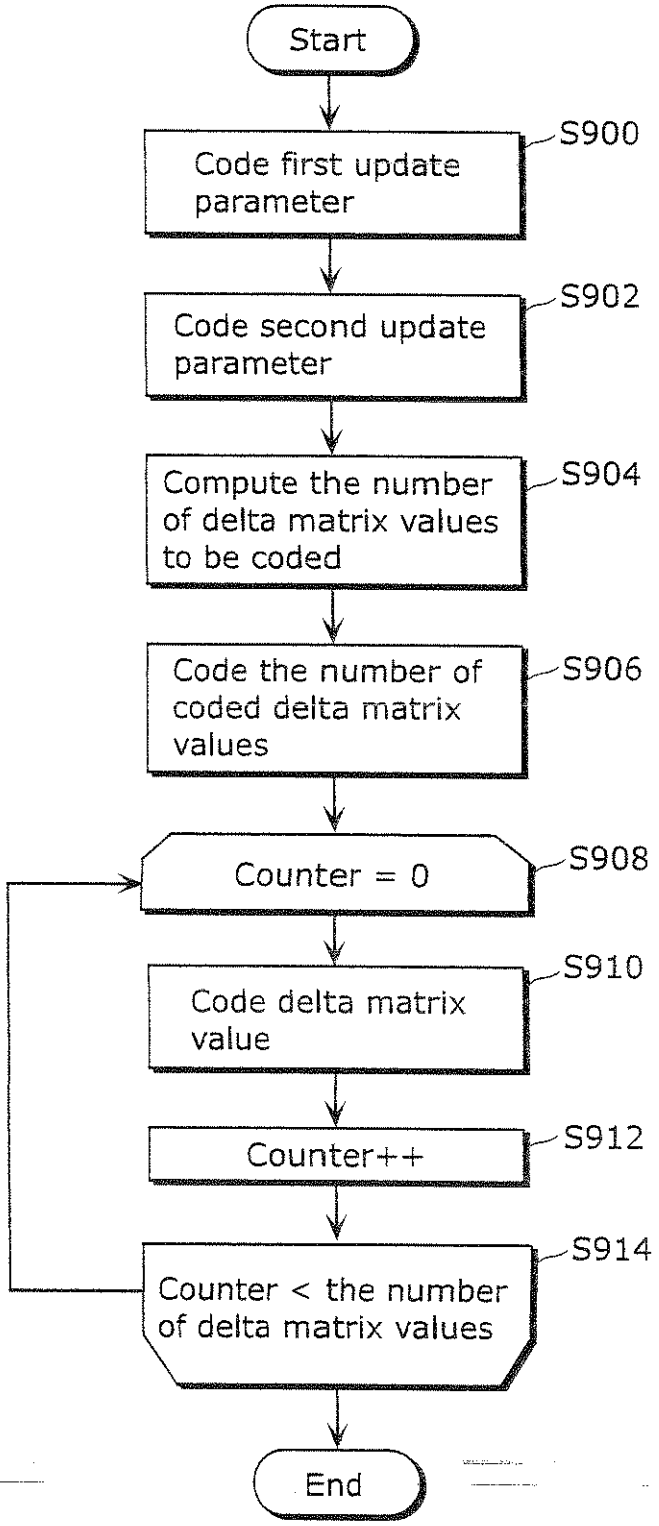

Start
Code first update parameter
S900
Code second update parameter
S902
Compute the number of delta matrix values to be coded
S904
Code the number of coded delta matrix values
S906
Counter = 0
S908
Code delta matrix value
S910
Counter++
S912
Counter < the number of delta matrix values
S914
End

FIG. 12

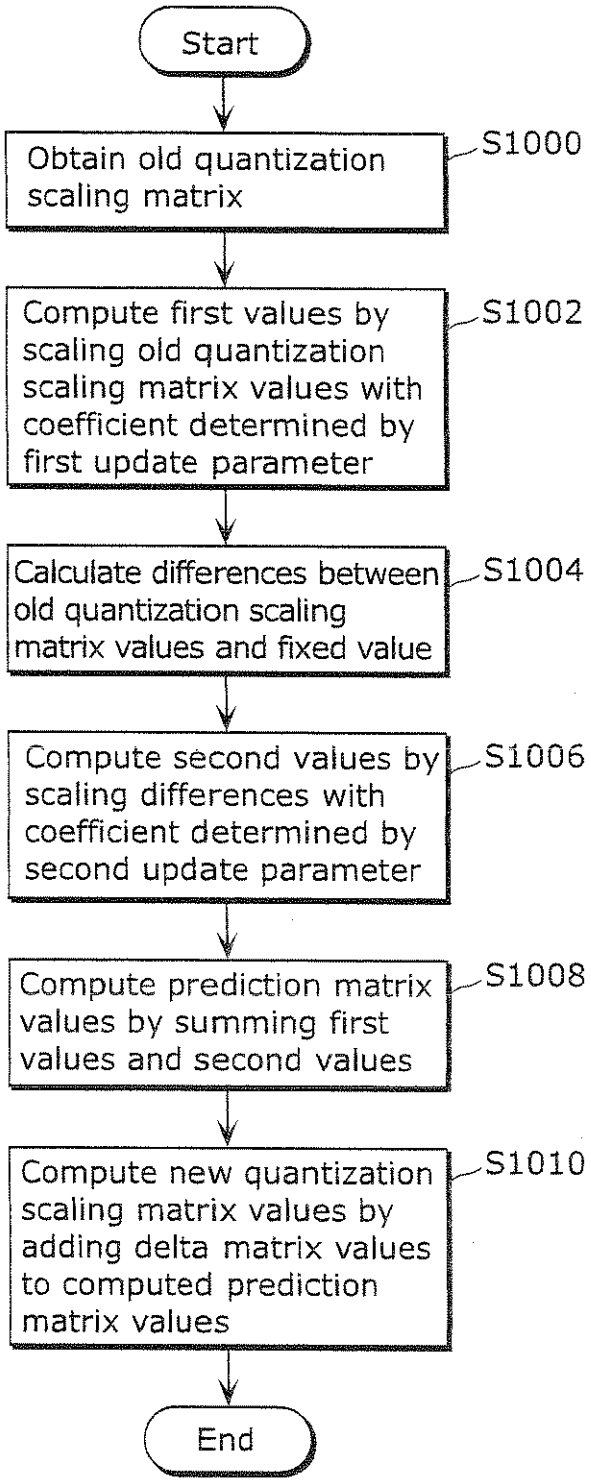

Start
Obtain old quantization scaling matrix
S1000
Compute first values by scaling old quantization scaling matrix values with coefficient determined by first update parameter
S1002
Calculate differences between old quantization scaling matrix values and fixed value
S1004
Compute second values by scaling differences with coefficient determined by second update parameter
S1006
Compute prediction matrix values by summing first values and second values
S1008
Compute new quantization scaling matrix values by adding delta matrix values to computed prediction matrix values
S1010
End

FIG. 13

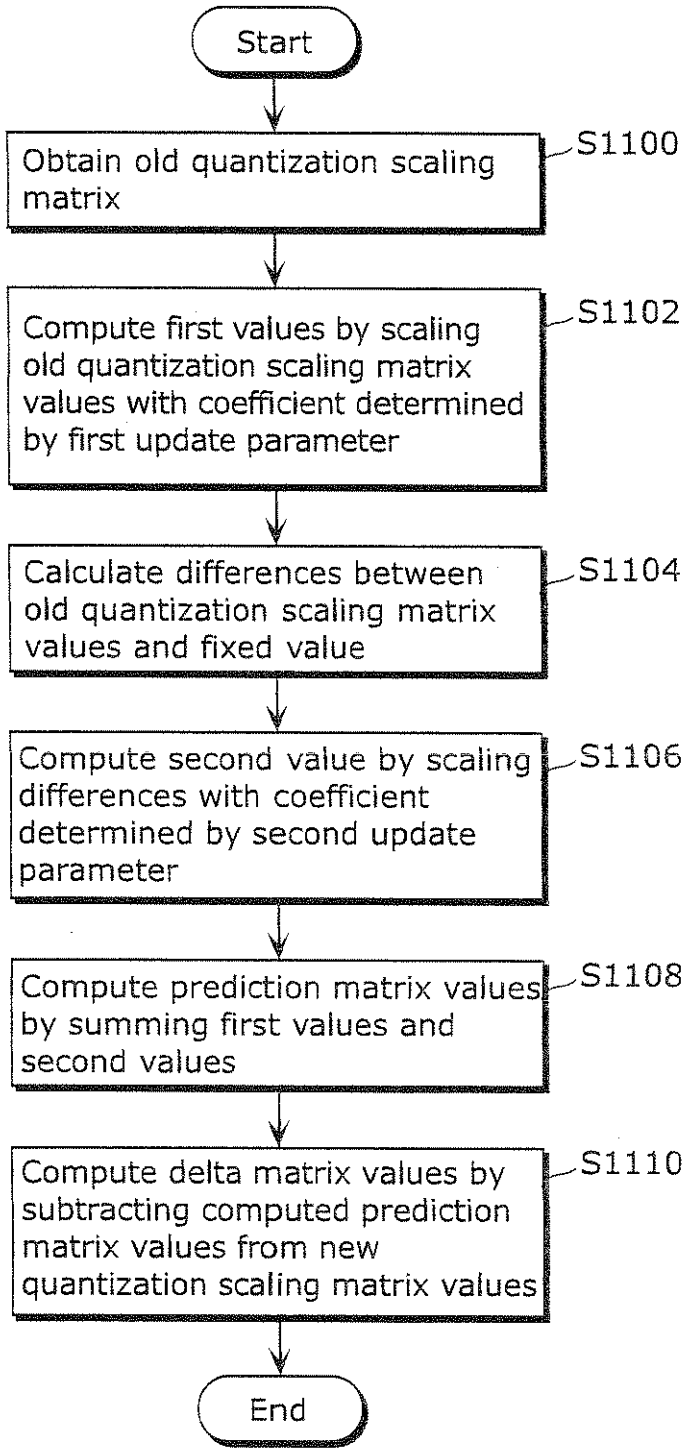

Start
Obtain old quantization scaling matrix
S1100
Compute first values by scaling old quantization scaling matrix values with coefficient determined by first update parameter
S1102
Calculate differences between old quantization scaling matrix values and fixed value
S1104
Compute second value by scaling differences with coefficient determined by second update parameter
S1106
Compute prediction matrix values by summing first values and second values
S1108
Compute delta matrix values by subtracting computed prediction matrix values from new quantization scaling matrix values
S1110
End

FIG. 14

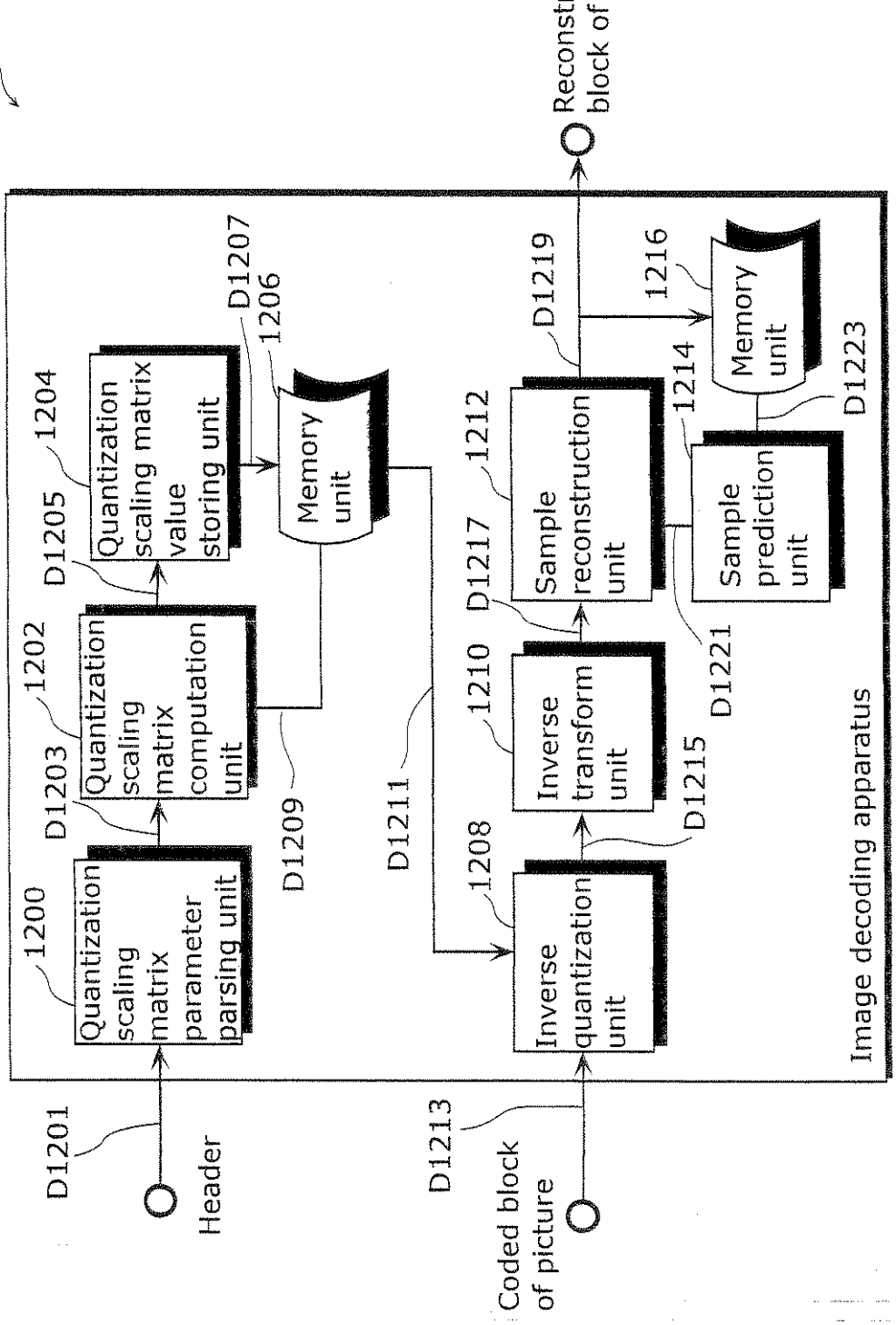

10A
Reconstructed block of picture
Image decoding apparatus
Quantization scaling matrix parameter parsing unit
1200
Quantization scaling matrix computation unit
1202
Quantization scaling matrix value storing unit
1204
Memory unit
1206
Inverse quantization unit
1208
Inverse transform unit
1210
Sample reconstruction unit
1212
Sample prediction unit
1214
Memory unit
1216
D1201
Header
D1203
D1205
D1207
D1209
D1211
D1213
Coded block of picture
D1215
D1217
D1219
D1221
D1223

FIG. 15

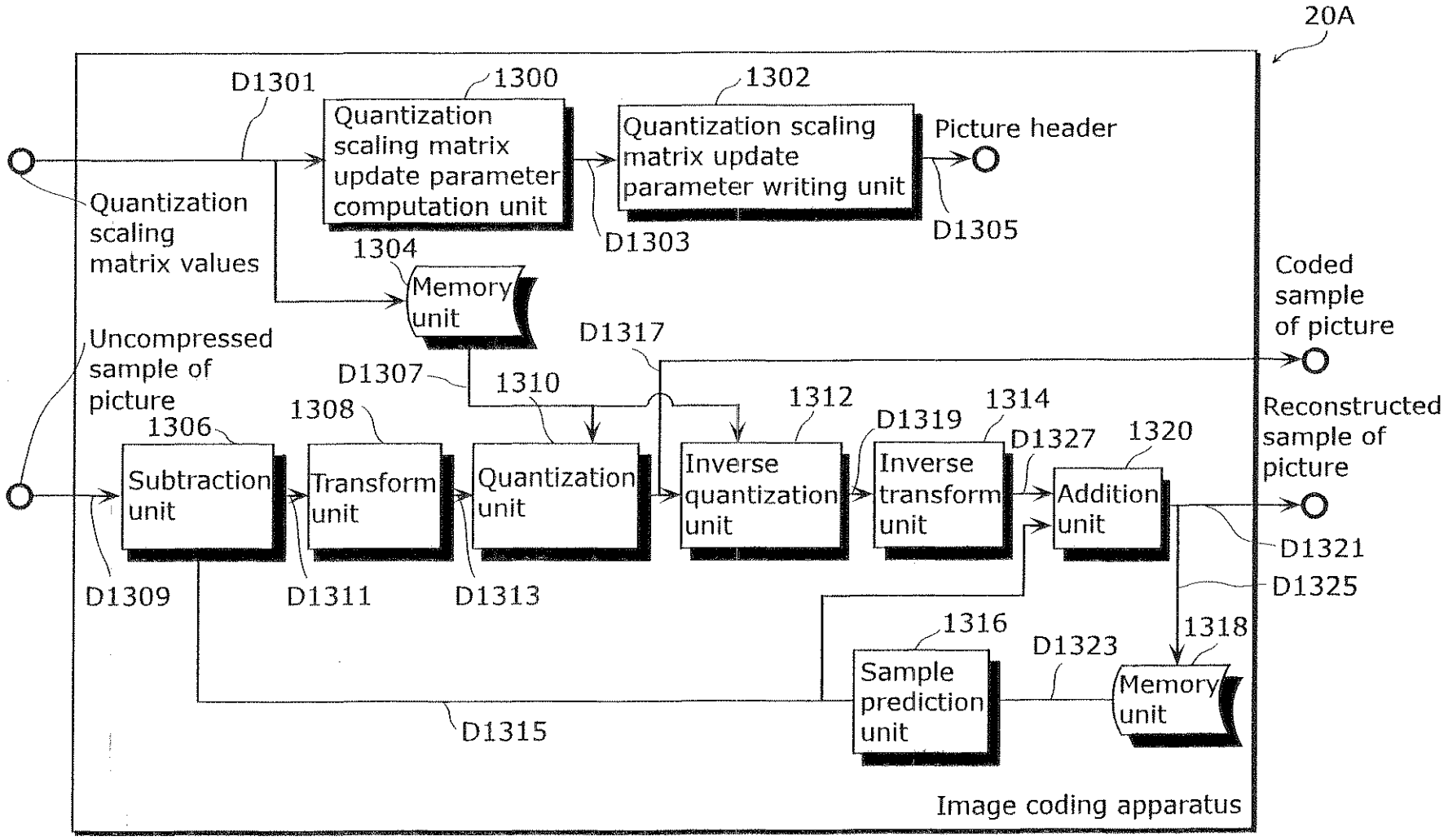

20A
D1301
1300
1302
Quantization scaling matrix update parameter computation unit
Quantization scaling matrix update parameter writing unit
Picture header
Quantization scaling matrix values
D1303
D1305
1304
Memory unit
Coded sample of picture
Uncompressed sample of picture
D1317
D1307
1310
1312
1314
D1319
D1327
1320
1306
1308
Subtraction unit
Transform unit
Quantization unit
Inverse quantization unit
Inverse transform unit
Addition unit
Reconstructed sample of picture
D1321
D1325
D1309
D1311
D1313
1316
1318
D1323
Sample prediction unit
Memory unit
D1315
Image coding apparatus

FIG. 16

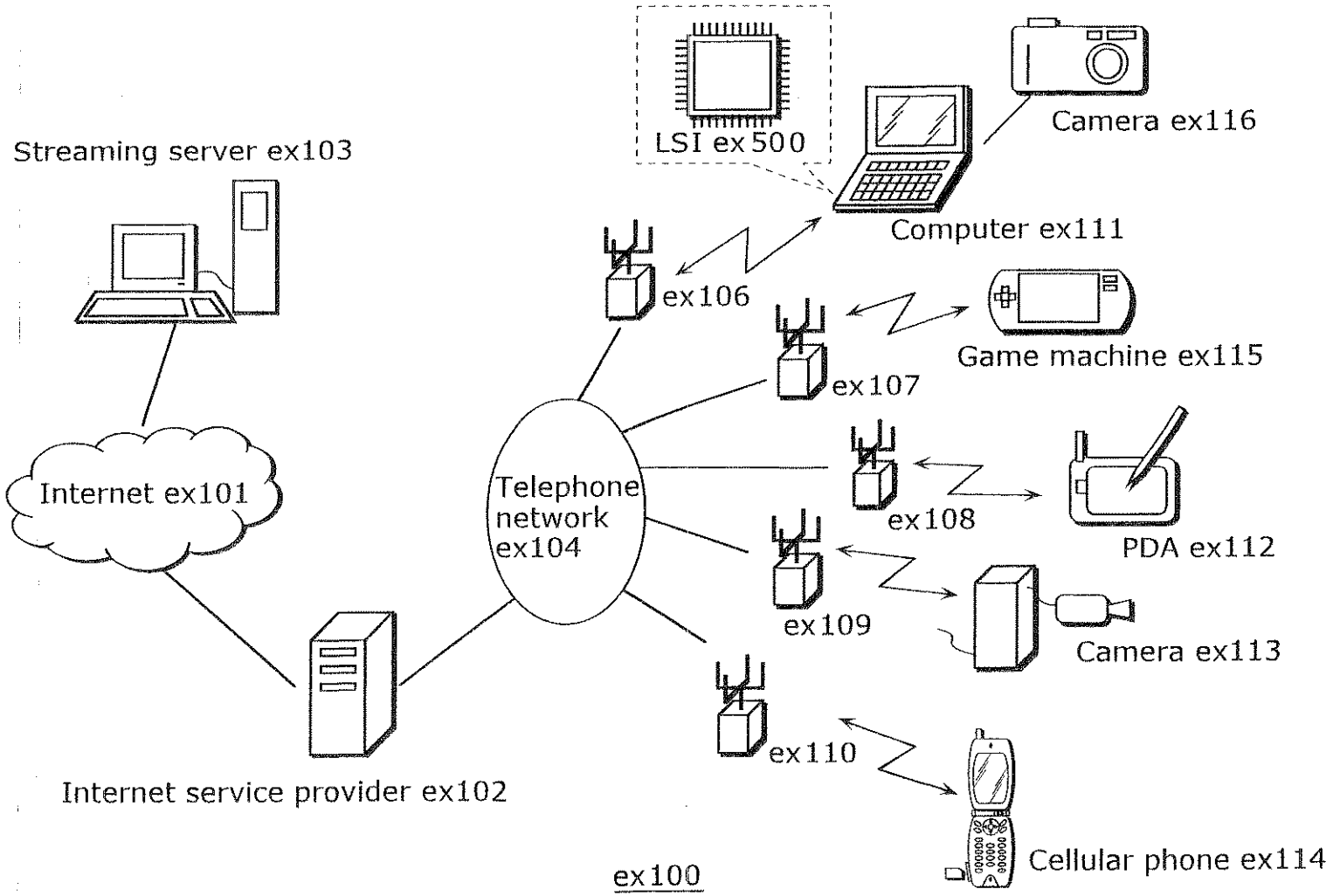

LSI ex500
Camera ex116
Streaming server ex103
Computer ex111
ex106
Game machine ex115
ex107
Internet ex101
Telephone network ex104
ex108
PDA ex112
ex109
Camera ex113
ex110
Internet service provider ex102
Cellular phone ex114
ex100

FIG. 17

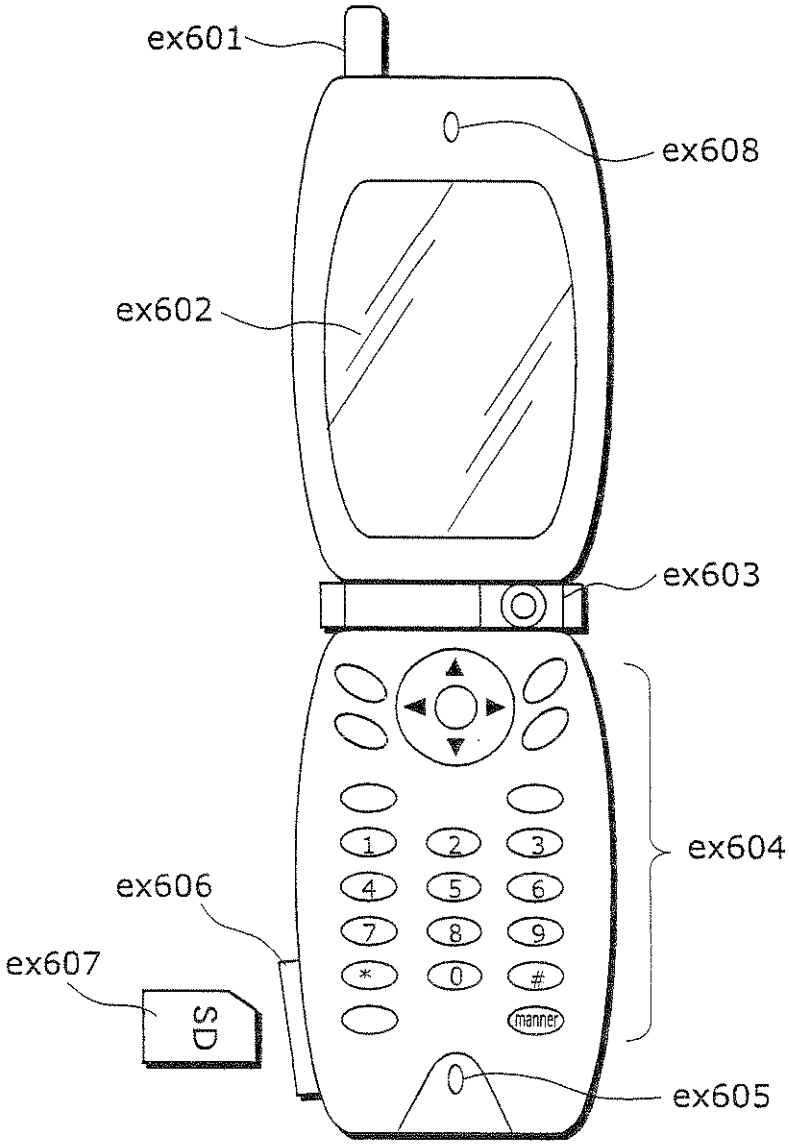

ex601
ex608
ex602
ex603
ex604
ex606
ex607
SD
ex605
manner
ex114

FIG. 18

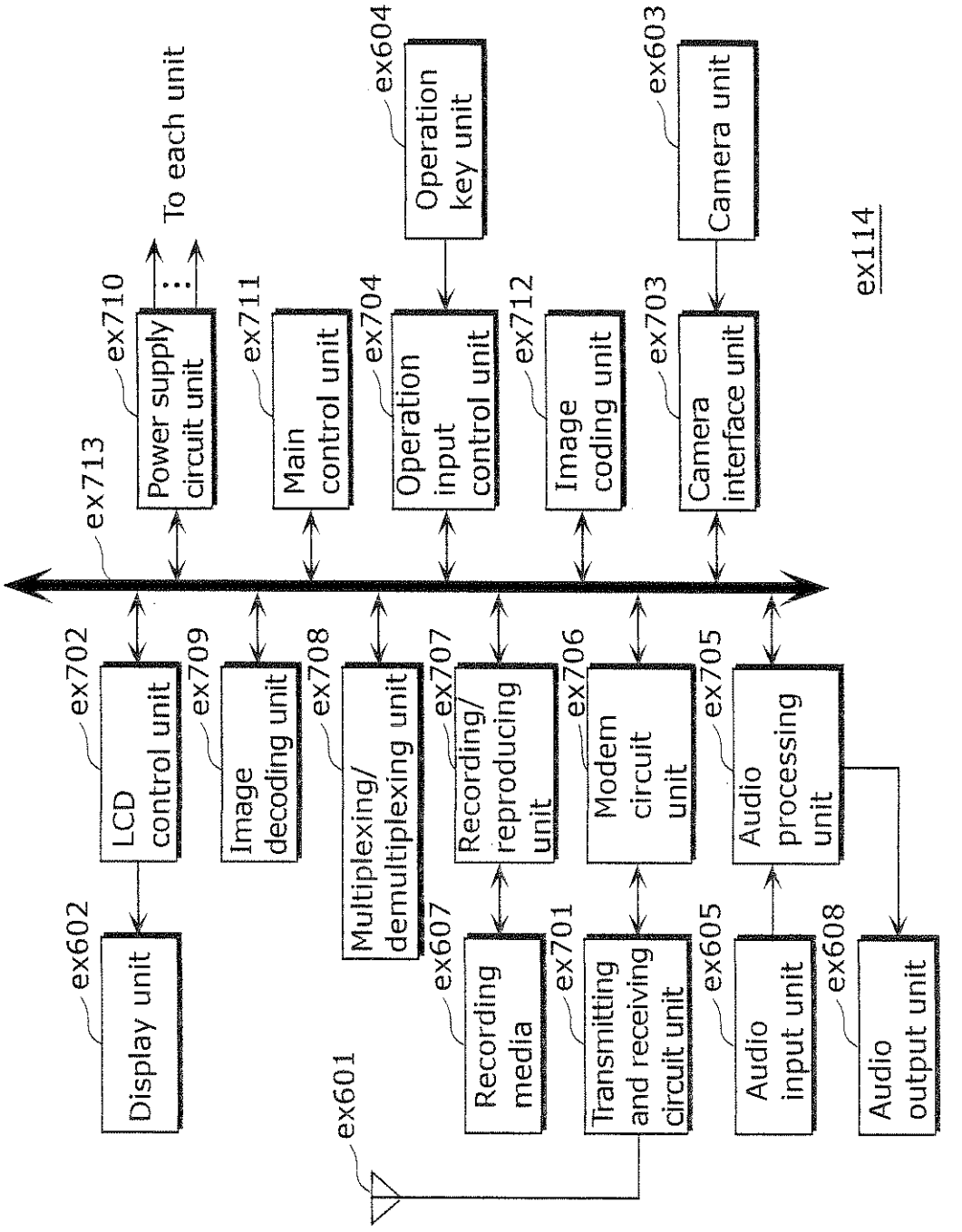

ex114
ex713
ex710
Power supply circuit unit
To each unit
ex711
Main control unit
ex704
Operation input control unit
ex604
Operation key unit
ex712
Image coding unit
ex703
Camera interface unit
ex603
Camera unit
ex702
LCD control unit
ex709
Image decoding unit
ex708
Multiplexing/ demultiplexing unit
ex707
Recording/ reproducing unit
ex706
Modem circuit unit
ex705
Audio processing unit
ex602
Display unit
ex607
Recording media
ex701
Transmitting and receiving circuit unit
ex605
Audio input unit
ex608
Audio output unit
ex601

FIG. 19

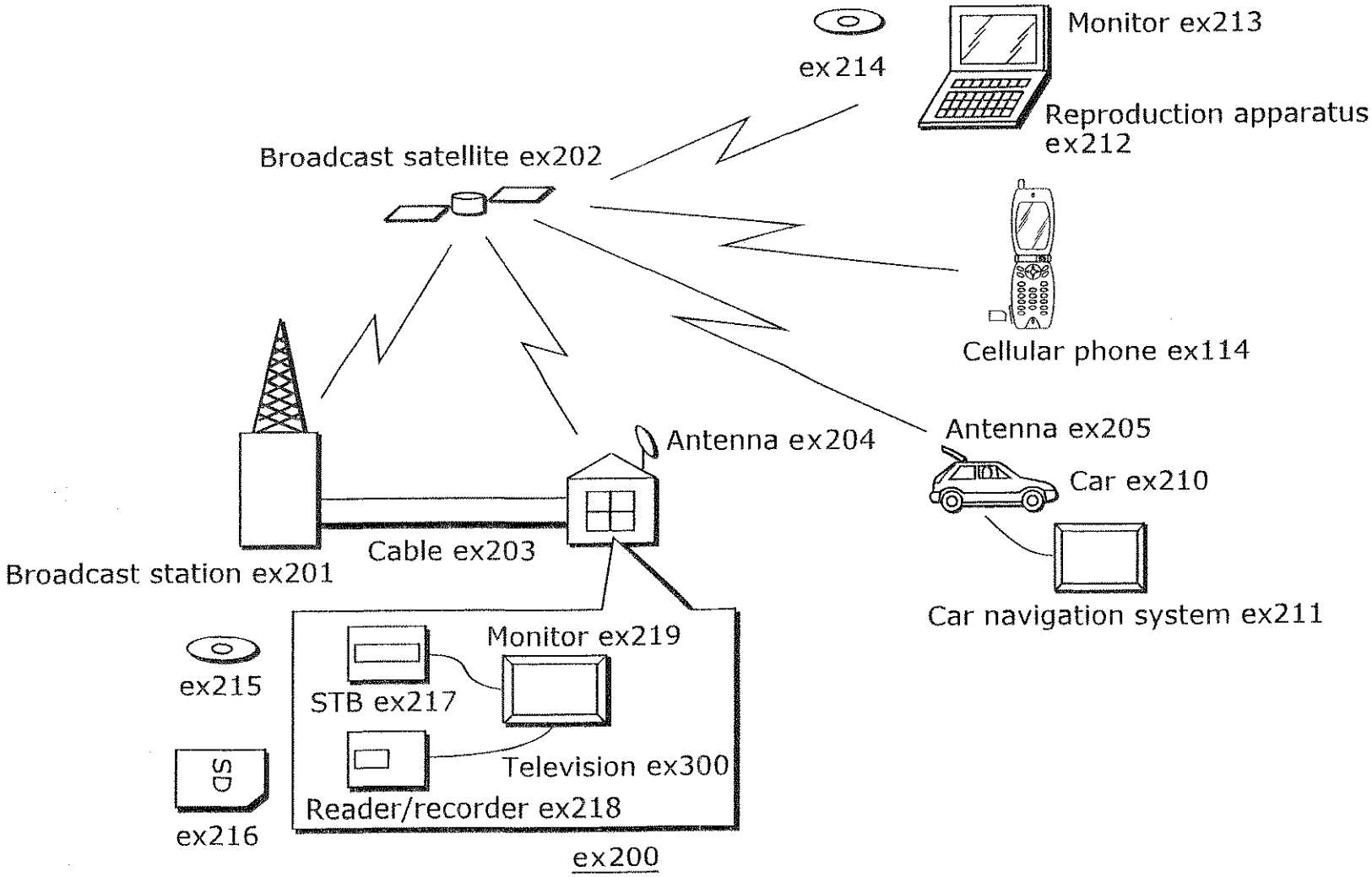

ex214
Monitor ex213
Reproduction apparatus ex212
Broadcast satellite ex202
Cellular phone ex114
Antenna ex204
Antenna ex205
Car ex210
Cable ex203
Broadcast station ex201
Car navigation system ex211
Monitor ex219
ex215
STB ex217
SD
Television ex300
Reader/recorder ex218
ex216
ex200

FIG. 20

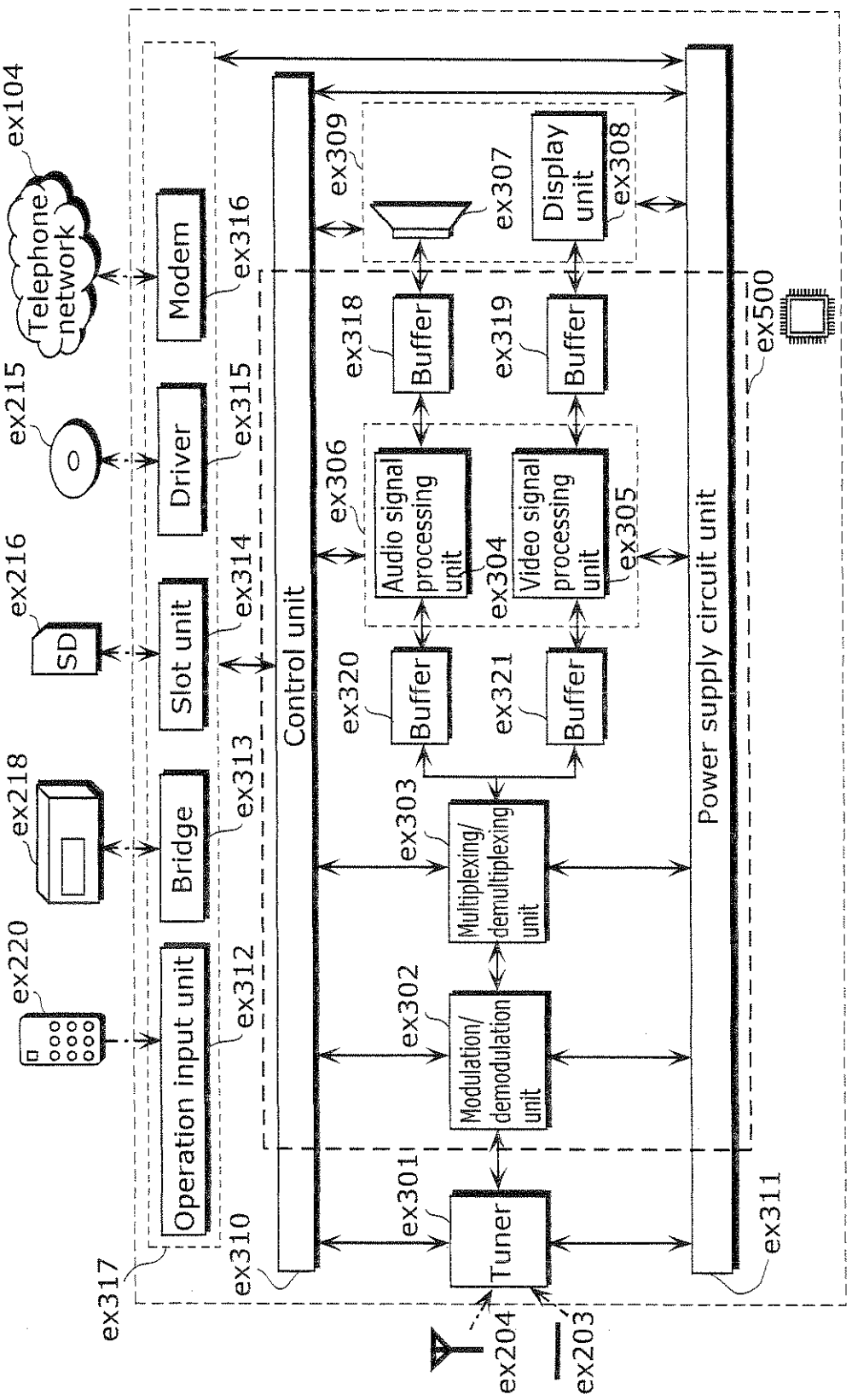

ex104
Telephone network
ex215
ex216
SD
ex218
ex220
ex317
Operation input unit
ex312
Bridge
ex313
Slot unit
ex314
Driver
ex315
Modem
ex316
Control unit
ex310
ex306
Audio signal processing unit
ex304
Video signal processing unit
ex305
ex307
ex309
Display unit
ex308
ex318
Buffer
ex319
Buffer
ex320
Buffer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

FIG. 21

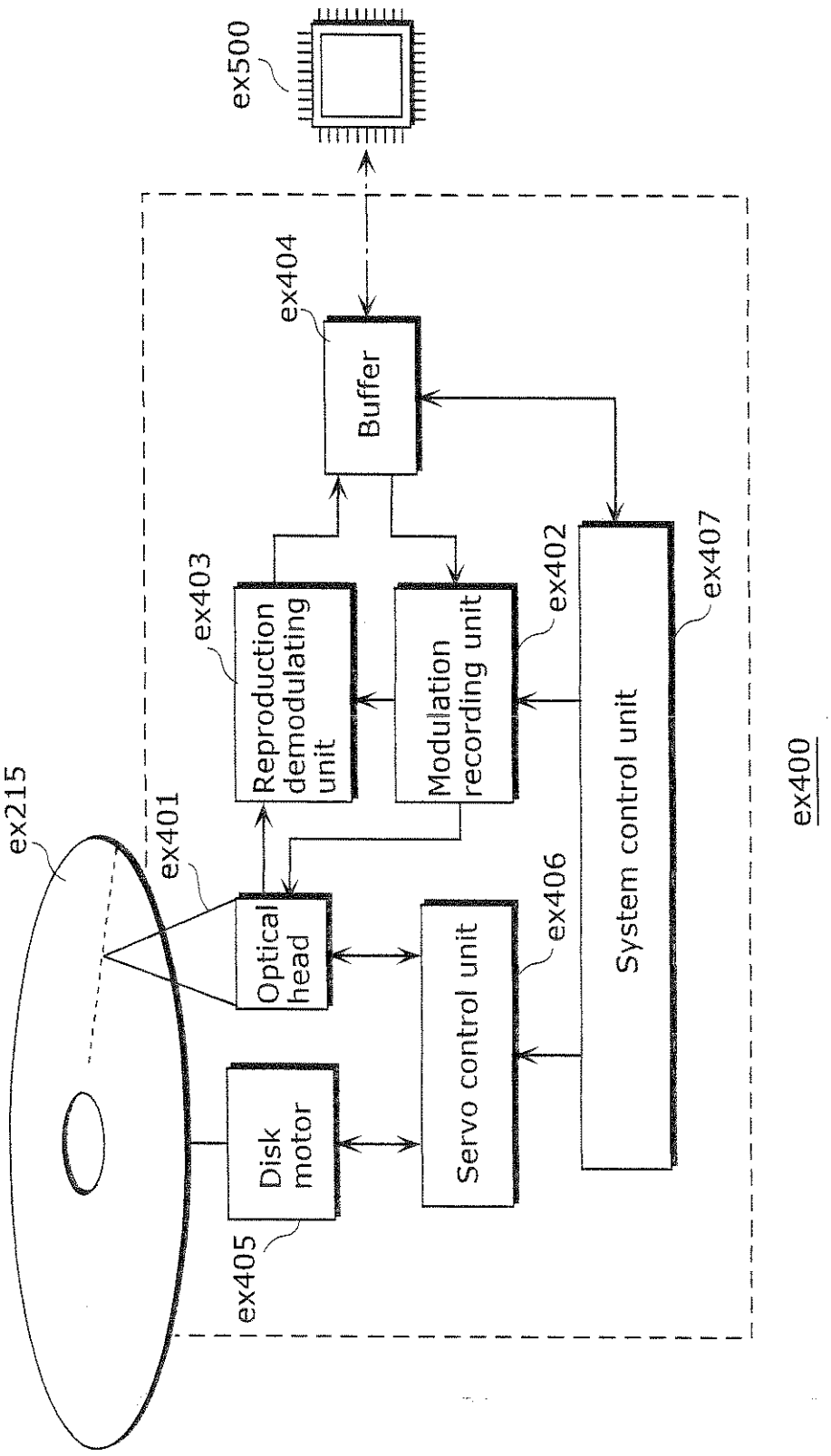

ex500
ex404
Buffer
ex403
Reproduction demodulating unit
ex402
Modulation recording unit
ex407
System control unit
ex215
ex401
Optical head
ex406
Servo control unit
Disk motor
ex405
ex400

FIG. 22

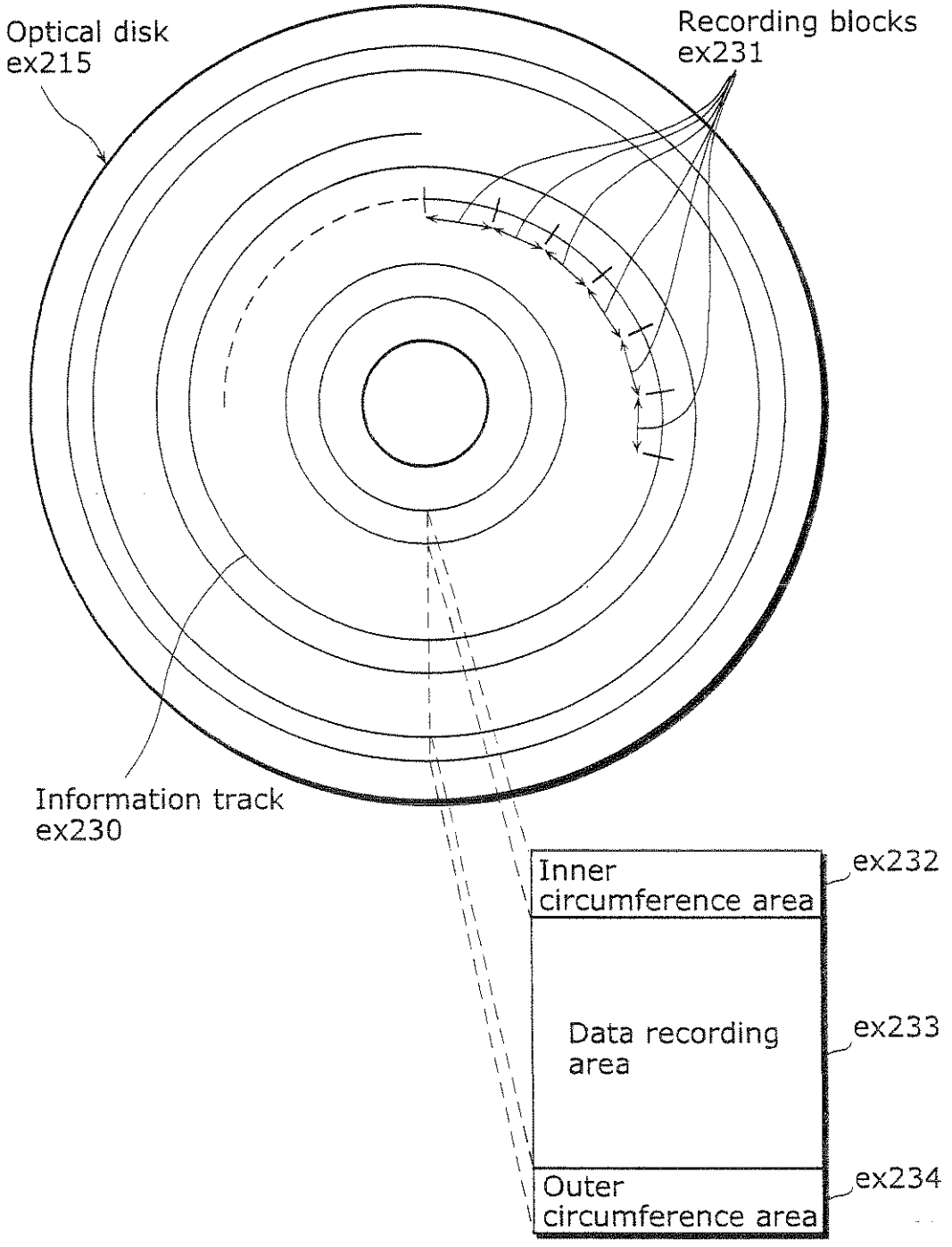
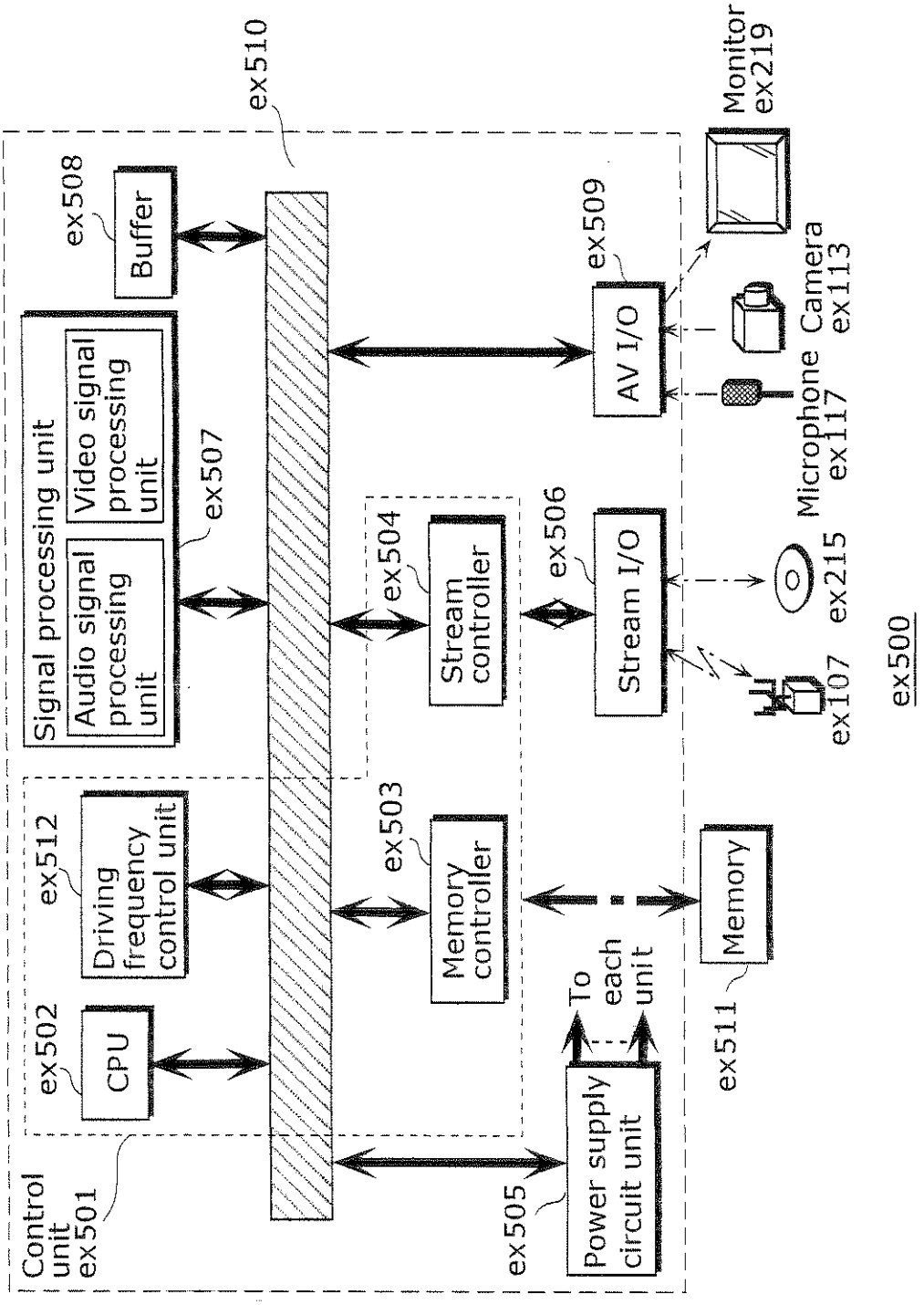

Optical disk
ex215
Recording blocks
ex231
Information track
ex230
Inner
circumference area
ex232
Data recording
area
ex233
Outer
circumference area
ex234

FIG. 23


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
Memory controller ex503
Stream controller ex504
Power supply circuit unit ex505
Stream I/O ex506
AV I/O ex509
To each unit
Memory ex511
Monitor ex219
Camera ex113
Microphone ex117
ex215
ex107
ex500