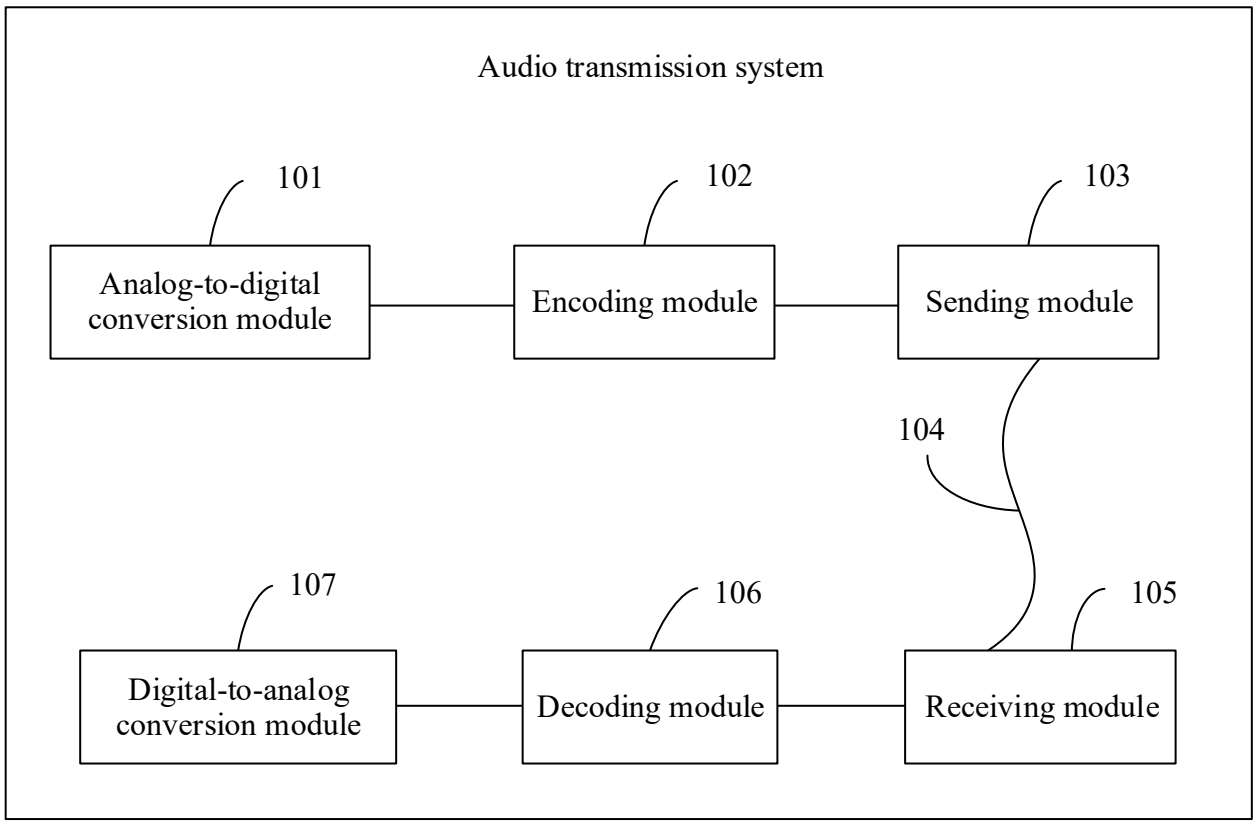

Audio transmission system
101
Analog-to-digital conversion module
102
Encoding module
103
Sending module
104
107
Digital-to-analog conversion module
106
Decoding module
105
Receiving module

FIG. 1

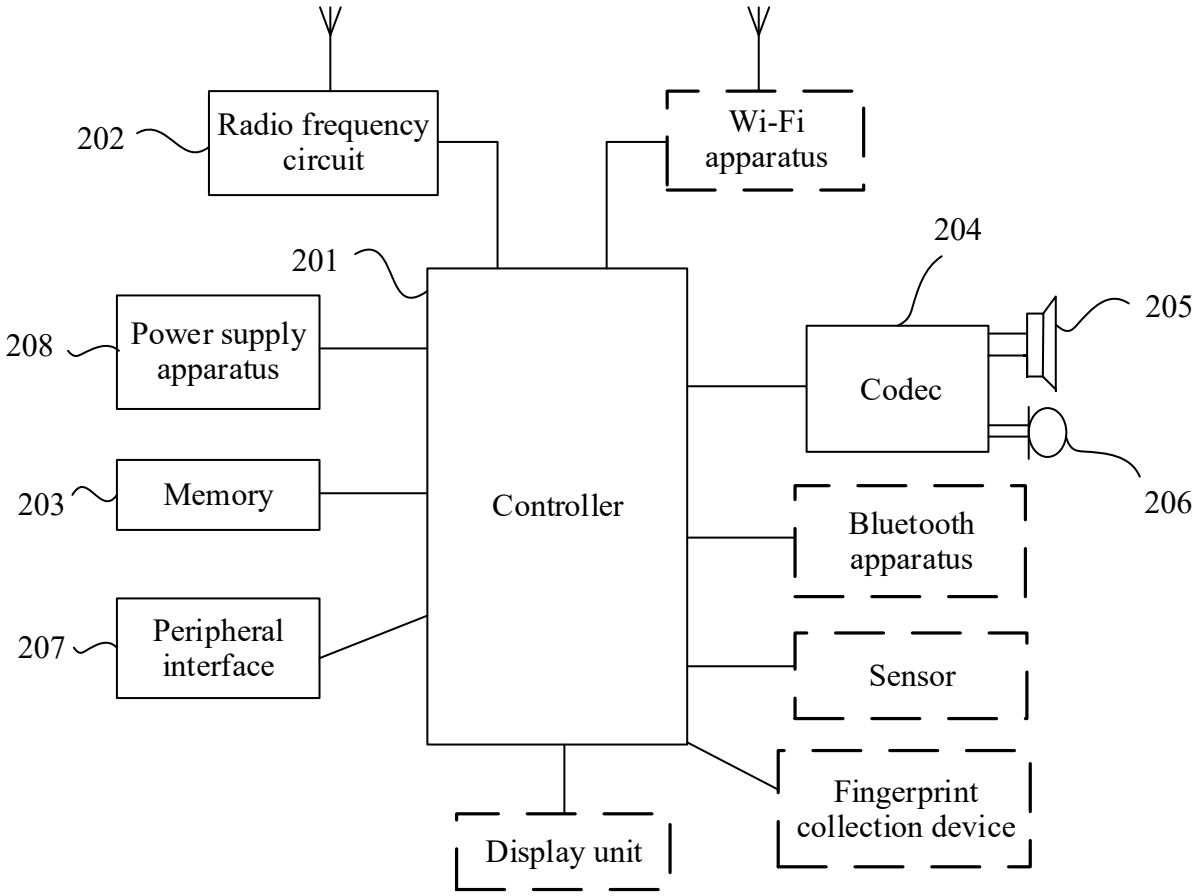

20
202
Radio frequency circuit
Wi-Fi apparatus
201
204
205
208
Power supply apparatus
Codec
203
Memory
Controller
206
Bluetooth apparatus
207
Peripheral interface
Sensor
Fingerprint collection device
Display unit

FIG. 2

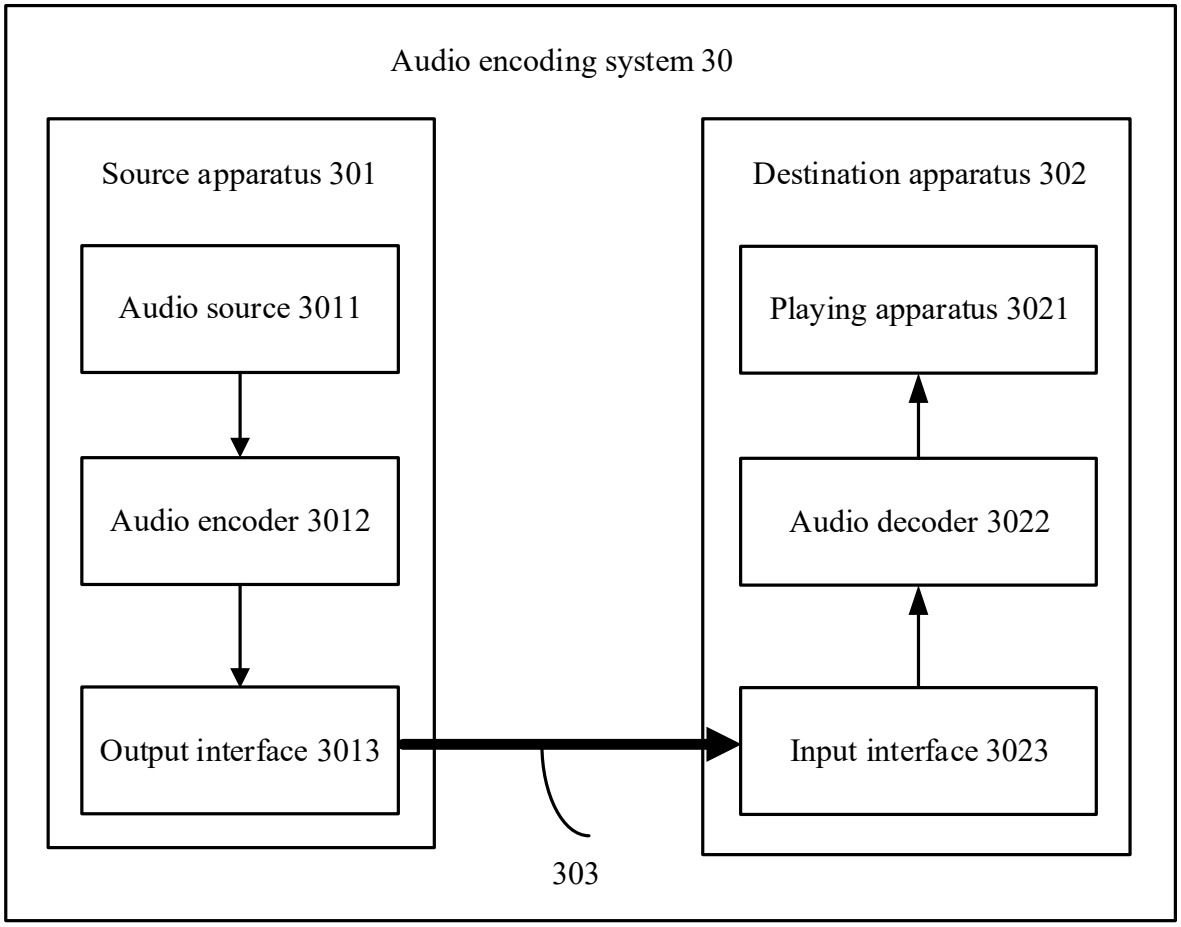

Audio encoding system 30
Source apparatus 301
Audio source 3011
Audio encoder 3012
Output interface 3013
Destination apparatus 302
Playing apparatus 3021
Audio decoder 3022
Input interface 3023
303

FIG. 3

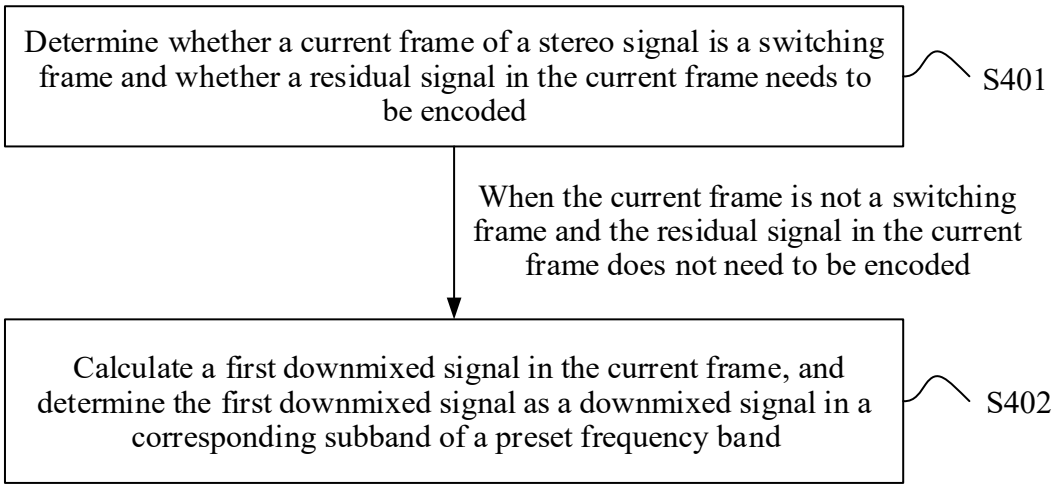

Determine whether a current frame of a stereo signal is a switching frame and whether a residual signal in the current frame needs to be encoded
S401
When the current frame is not a switching frame and the residual signal in the current frame does not need to be encoded
Calculate a first downmixed signal in the current frame, and determine the first downmixed signal as a downmixed signal in a corresponding subband of a preset frequency band
S402

FIG. 4

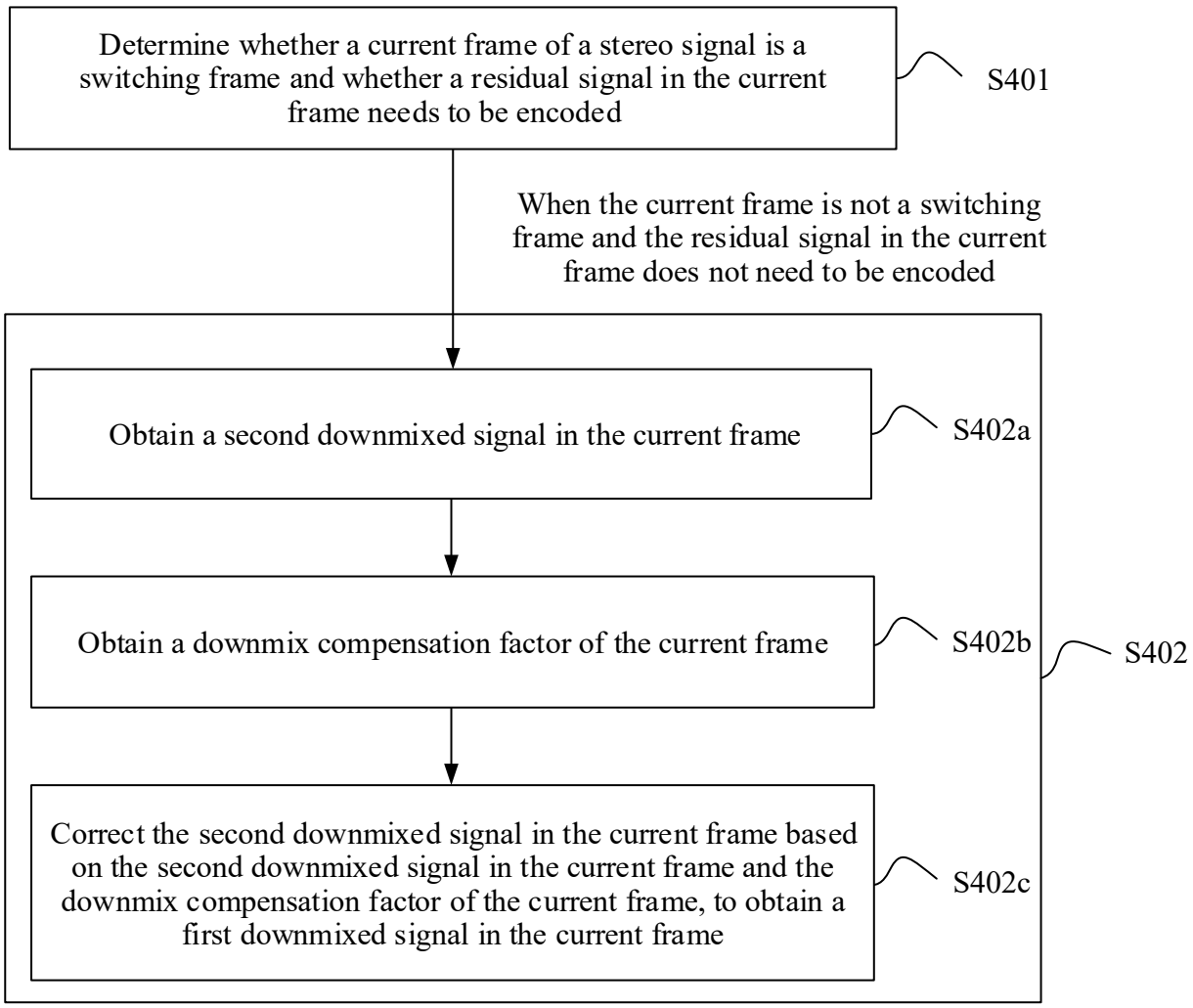

Determine whether a current frame of a stereo signal is a switching frame and whether a residual signal in the current frame needs to be encoded
S401
When the current frame is not a switching frame and the residual signal in the current frame does not need to be encoded
Obtain a second downmixed signal in the current frame
S402a
Obtain a downmix compensation factor of the current frame
S402b
S402
Correct the second downmixed signal in the current frame based on the second downmixed signal in the current frame and the downmix compensation factor of the current frame, to obtain a first downmixed signal in the current frame
S402c

FIG. 5A

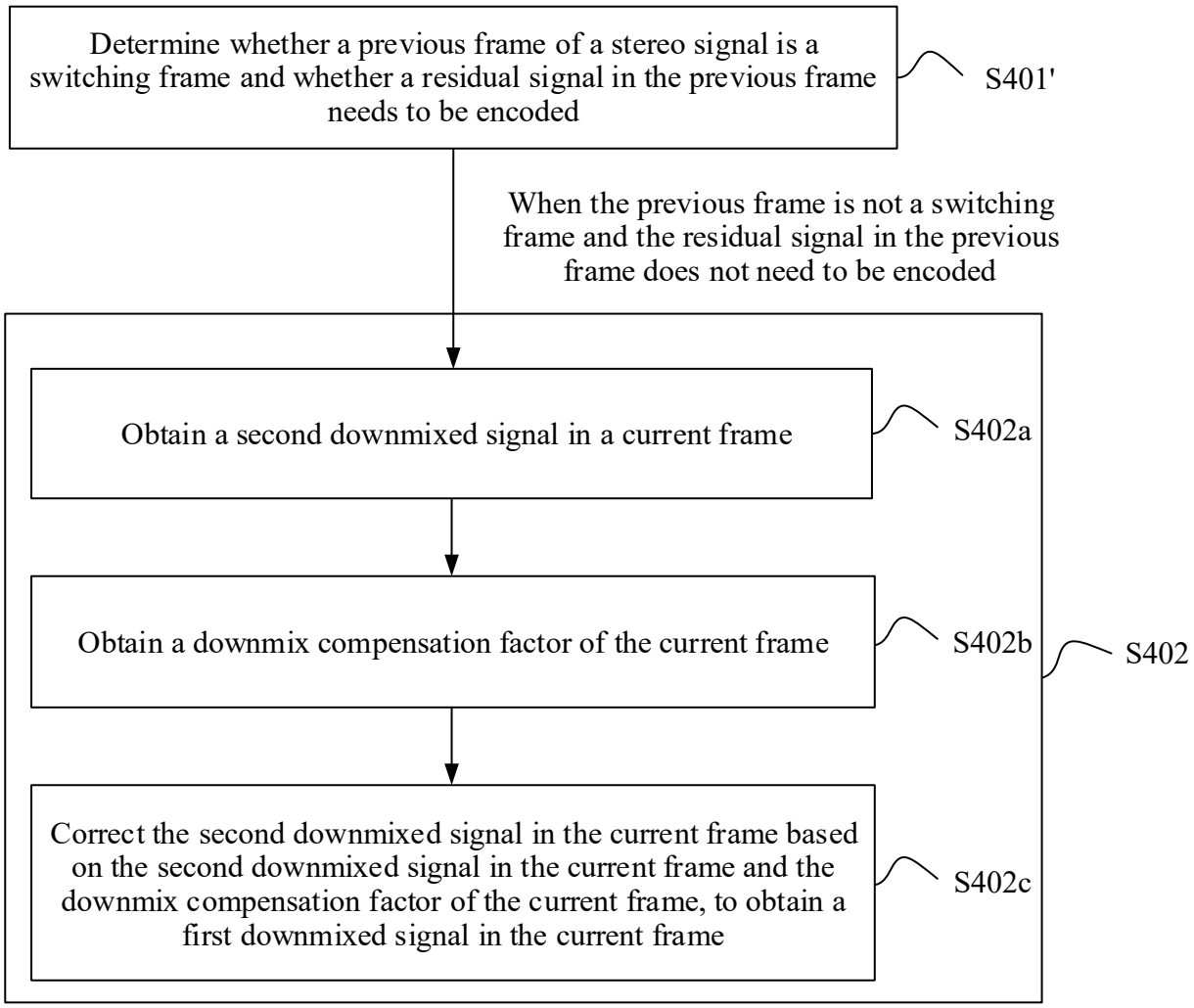

Determine whether a previous frame of a stereo signal is a switching frame and whether a residual signal in the previous frame needs to be encoded
S401'
When the previous frame is not a switching frame and the residual signal in the previous frame does not need to be encoded
Obtain a second downmixed signal in a current frame
S402a
Obtain a downmix compensation factor of the current frame
S402b
S402
Correct the second downmixed signal in the current frame based on the second downmixed signal in the current frame and the downmix compensation factor of the current frame, to obtain a first downmixed signal in the current frame
S402c

FIG. 5B

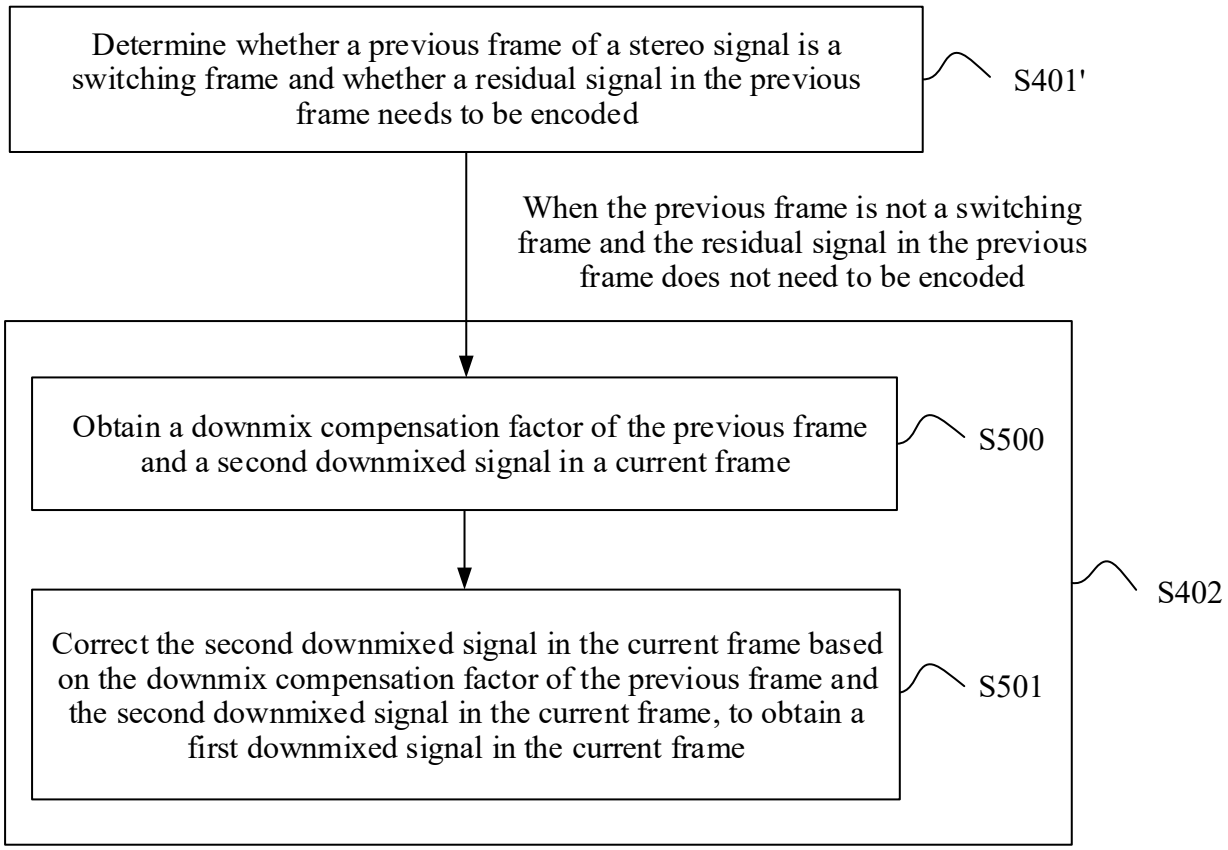
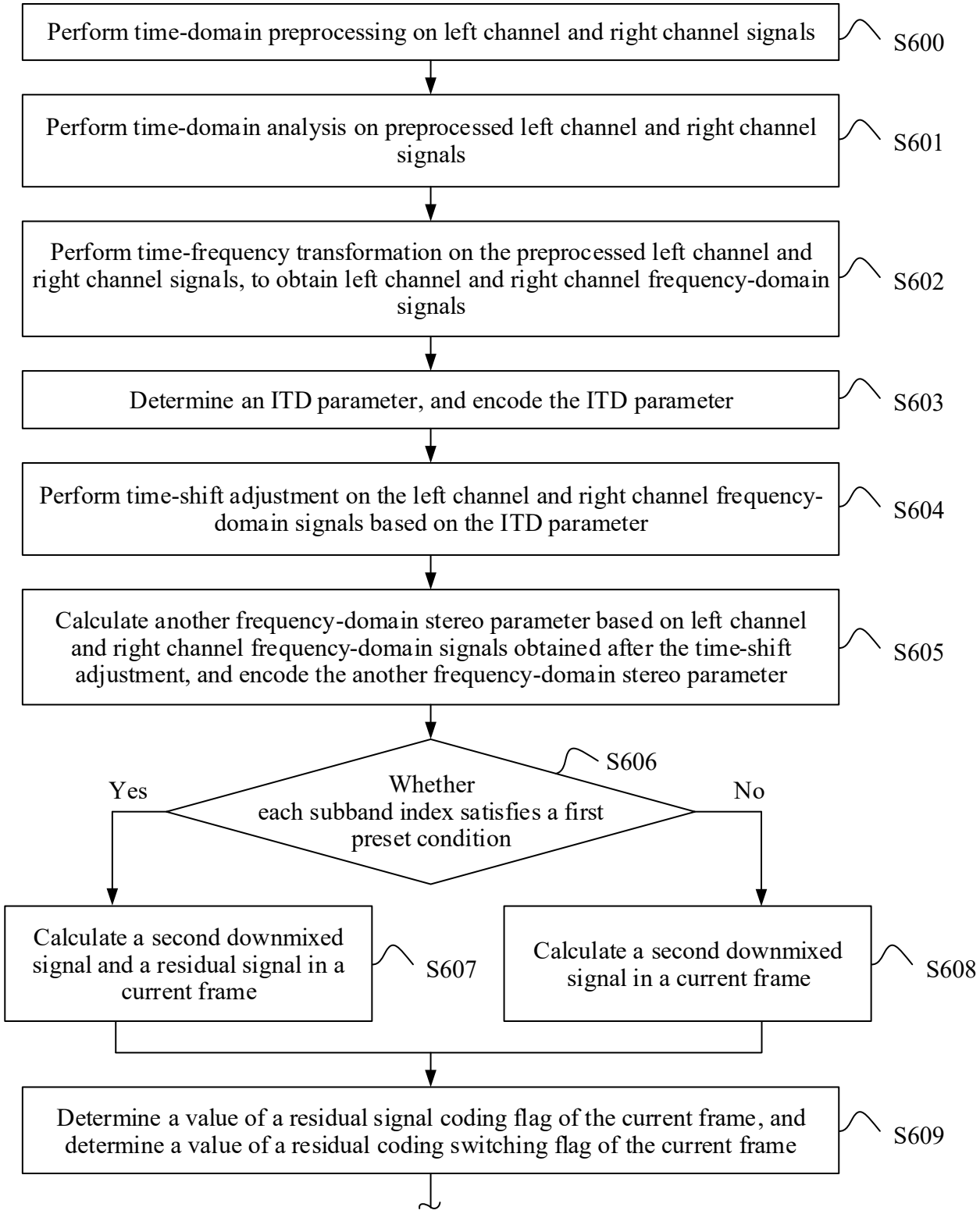

Determine whether a previous frame of a stereo signal is a switching frame and whether a residual signal in the previous frame needs to be encoded
S401'
When the previous frame is not a switching frame and the residual signal in the previous frame does not need to be encoded
Obtain a downmix compensation factor of the previous frame and a second downmixed signal in a current frame
S500
Correct the second downmixed signal in the current frame based on the downmix compensation factor of the previous frame and the second downmixed signal in the current frame, to obtain a first downmixed signal in the current frame
S501
S402

FIG. 5C



TO FIG. 6B

FIG. 6A

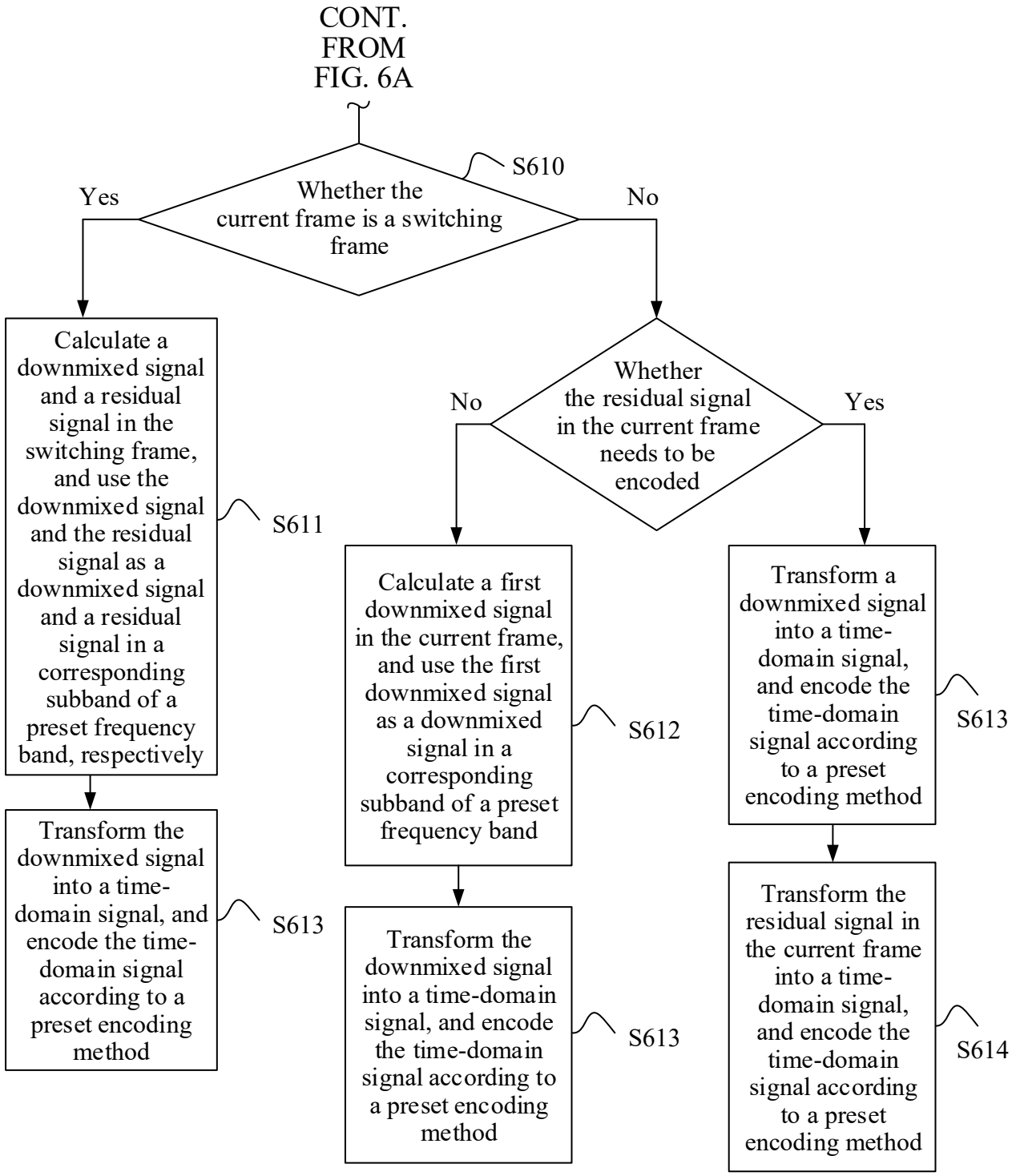
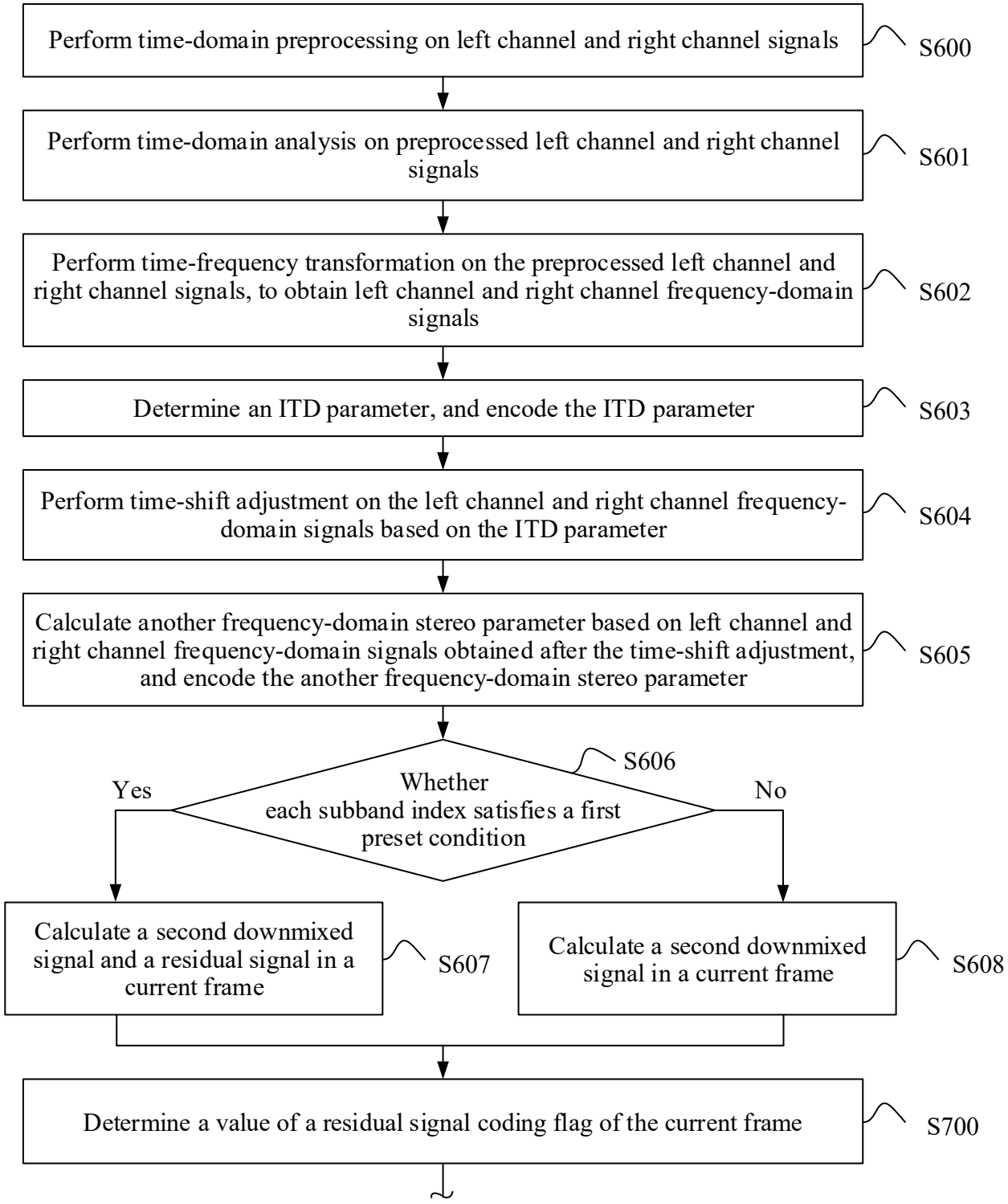

CONT. FROM FIG. 6A
Whether the current frame is a switching frame
S610
Yes
No
Calculate a downmixed signal and a residual signal in the switching frame, and use the downmixed signal and the residual signal as a downmixed signal and a residual signal in a corresponding subband of a preset frequency band, respectively
S611
Transform the downmixed signal into a time-domain signal, and encode the time-domain signal according to a preset encoding method
S613
Whether the residual signal in the current frame needs to be encoded
No
Yes
Calculate a first downmixed signal in the current frame, and use the first downmixed signal as a downmixed signal in a corresponding subband of a preset frequency band
S612
Transform the downmixed signal into a time-domain signal, and encode the time-domain signal according to a preset encoding method
S613
Transform a downmixed signal into a time-domain signal, and encode the time-domain signal according to a preset encoding method
S613
Transform the residual signal in the current frame into a time-domain signal, and encode the time-domain signal according to a preset encoding method
S614

FIG. 6B



TO FIG. 7B

FIG. 7A

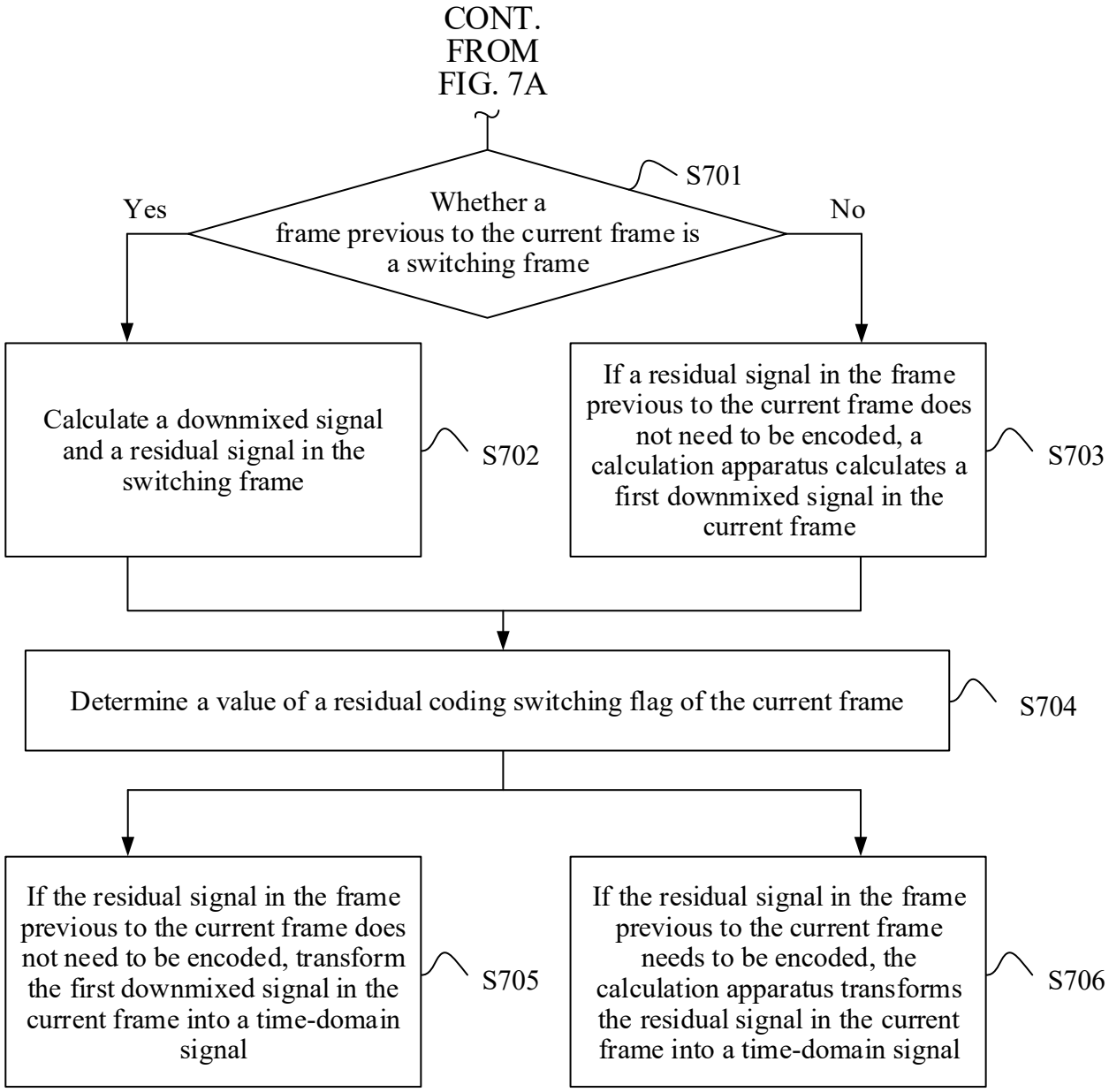
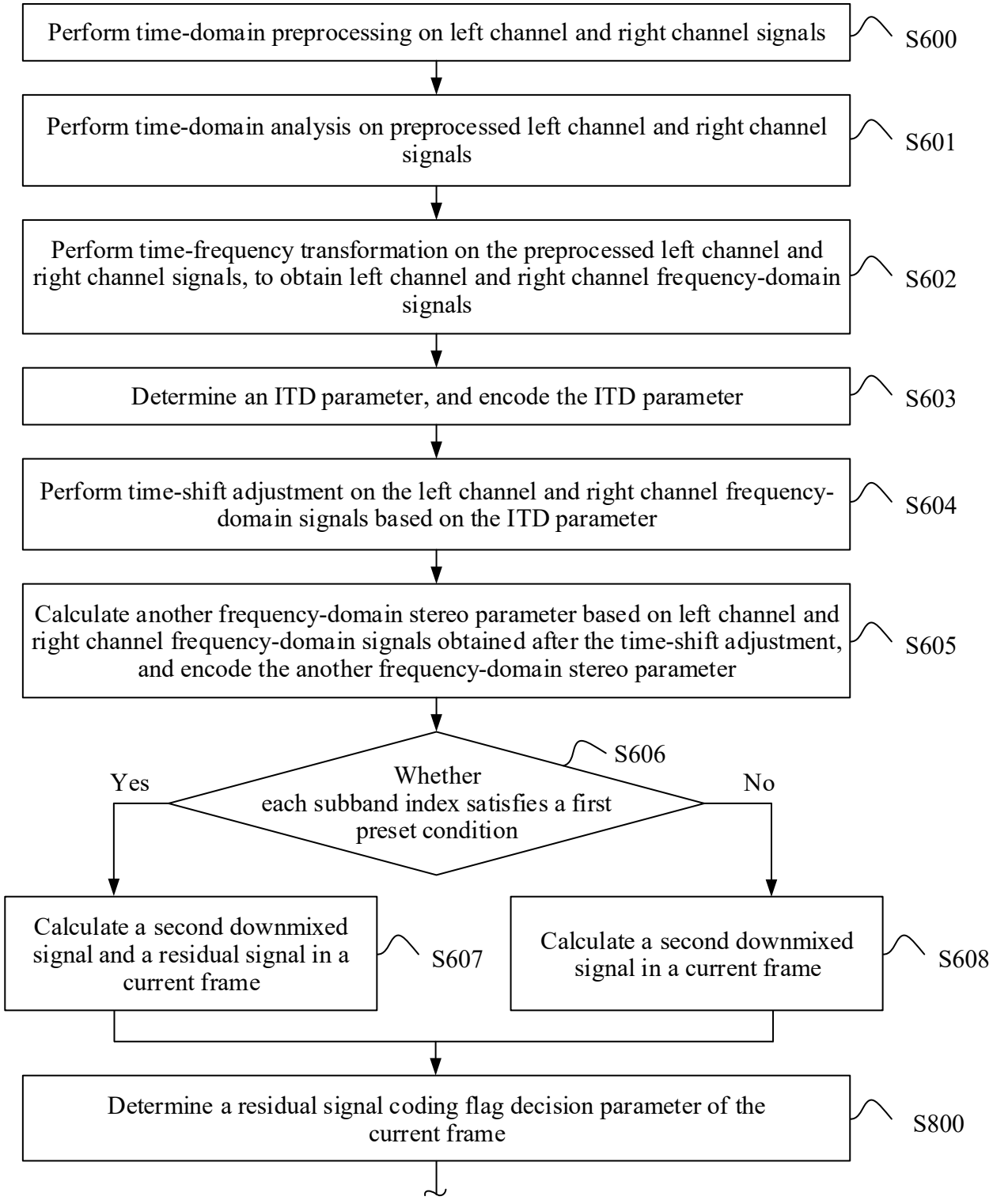

CONT. FROM FIG. 7A
S701
Whether a frame previous to the current frame is a switching frame
Yes
No
Calculate a downmixed signal and a residual signal in the switching frame
S702
If a residual signal in the frame previous to the current frame does not need to be encoded, a calculation apparatus calculates a first downmixed signal in the current frame
S703
Determine a value of a residual coding switching flag of the current frame
S704
If the residual signal in the frame previous to the current frame does not need to be encoded, transform the first downmixed signal in the current frame into a time-domain signal
S705
If the residual signal in the frame previous to the current frame needs to be encoded, the calculation apparatus transforms the residual signal in the current frame into a time-domain signal
S706

FIG. 7B



TO FIG. 8B

FIG. 8A

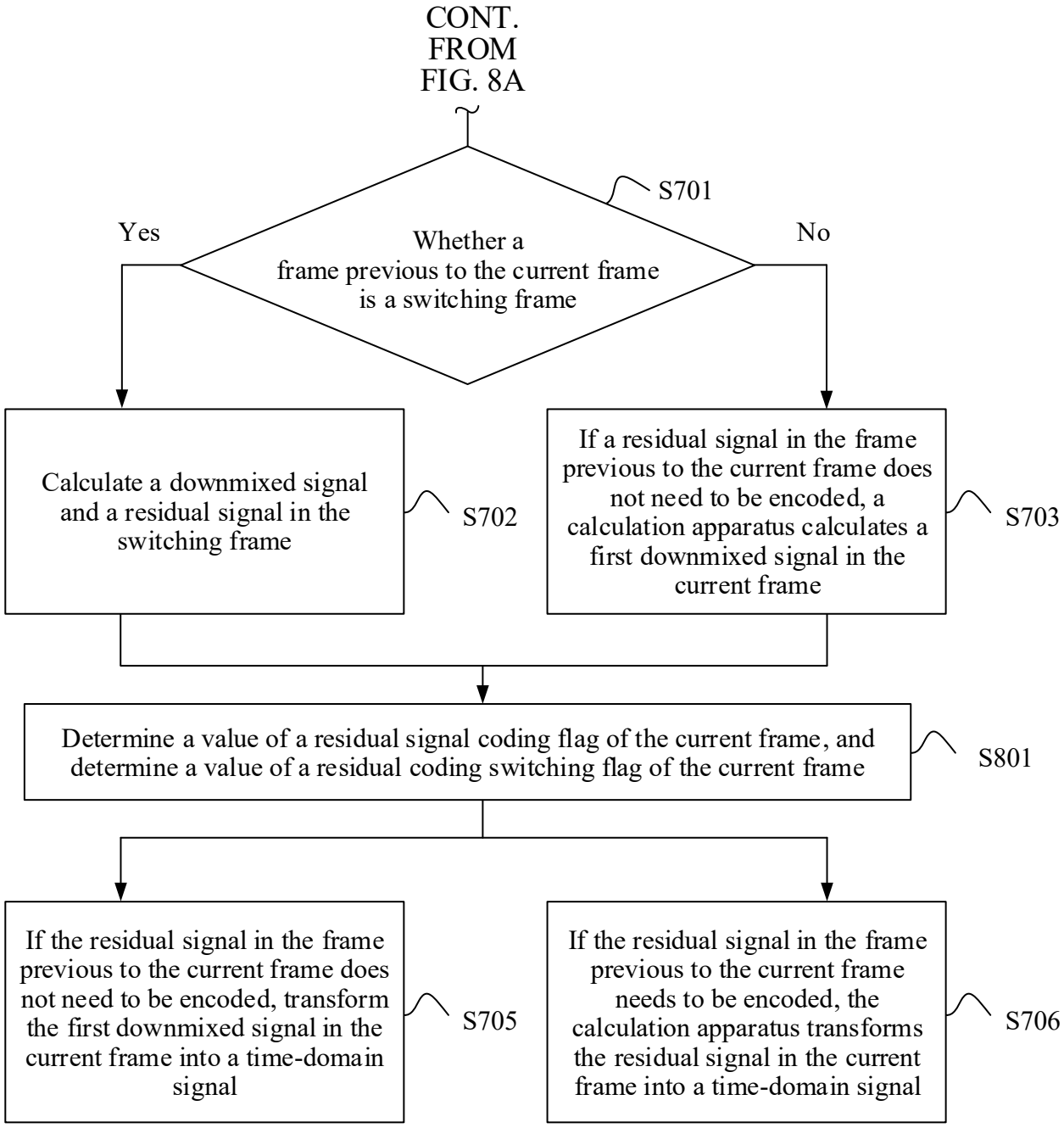
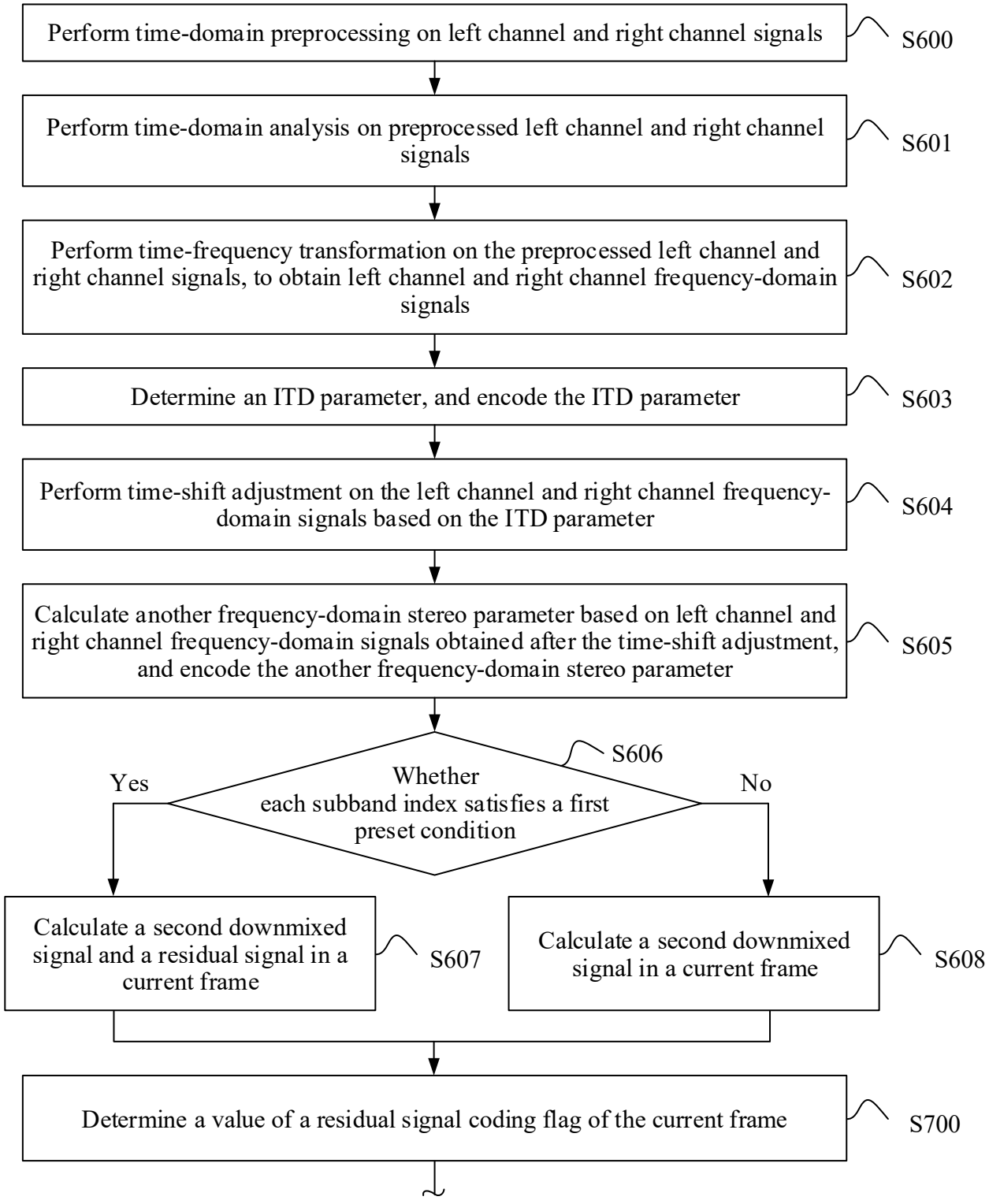

CONT. FROM FIG. 8A
S701
Whether a frame previous to the current frame is a switching frame
Yes
No
Calculate a downmixed signal and a residual signal in the switching frame
S702
If a residual signal in the frame previous to the current frame does not need to be encoded, a calculation apparatus calculates a first downmixed signal in the current frame
S703
Determine a value of a residual signal coding flag of the current frame, and determine a value of a residual coding switching flag of the current frame
S801
If the residual signal in the frame previous to the current frame does not need to be encoded, transform the first downmixed signal in the current frame into a time-domain signal
S705
If the residual signal in the frame previous to the current frame needs to be encoded, the calculation apparatus transforms the residual signal in the current frame into a time-domain signal
S706

FIG. 8B



TO FIG. 9B

FIG. 9A

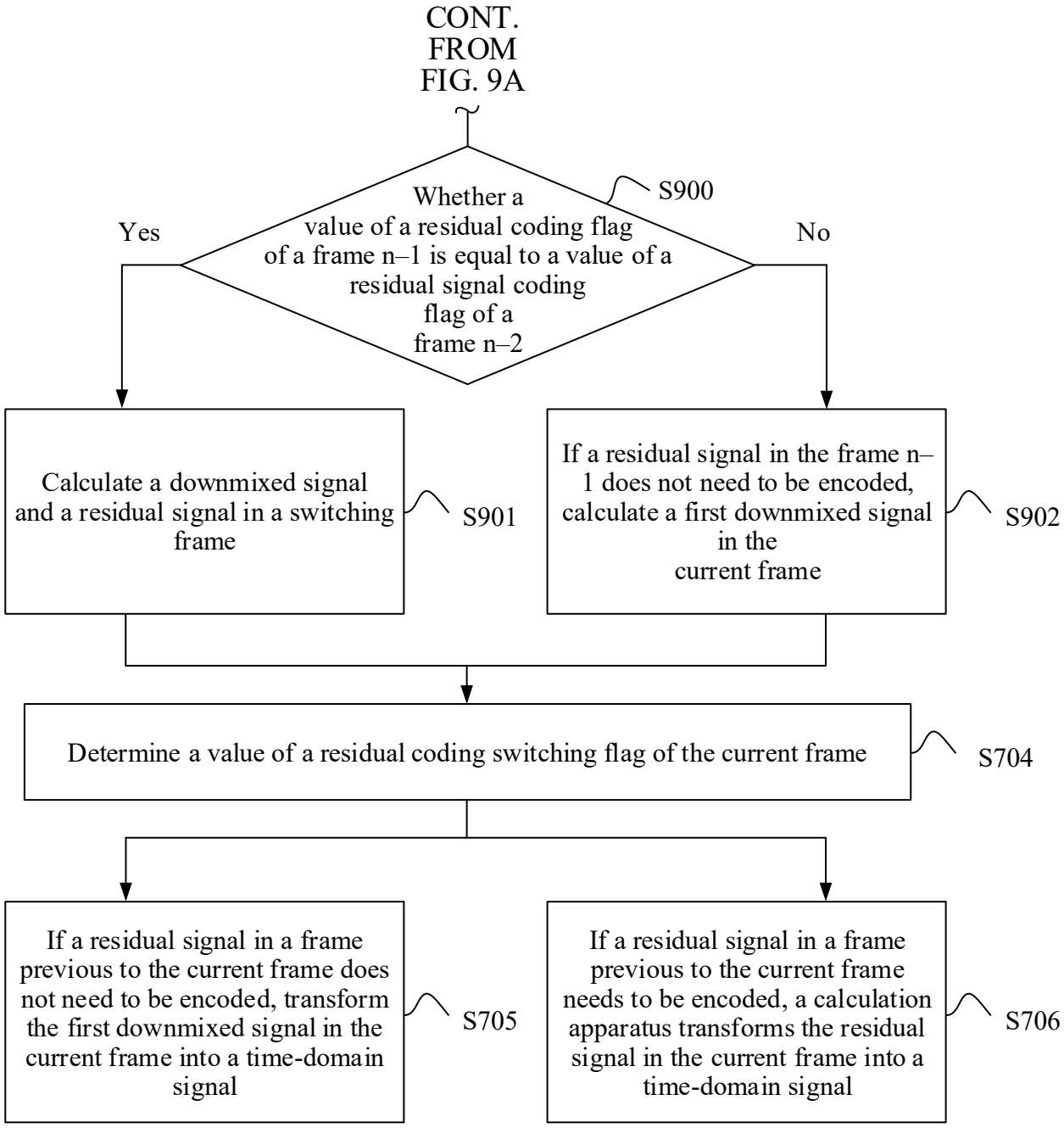
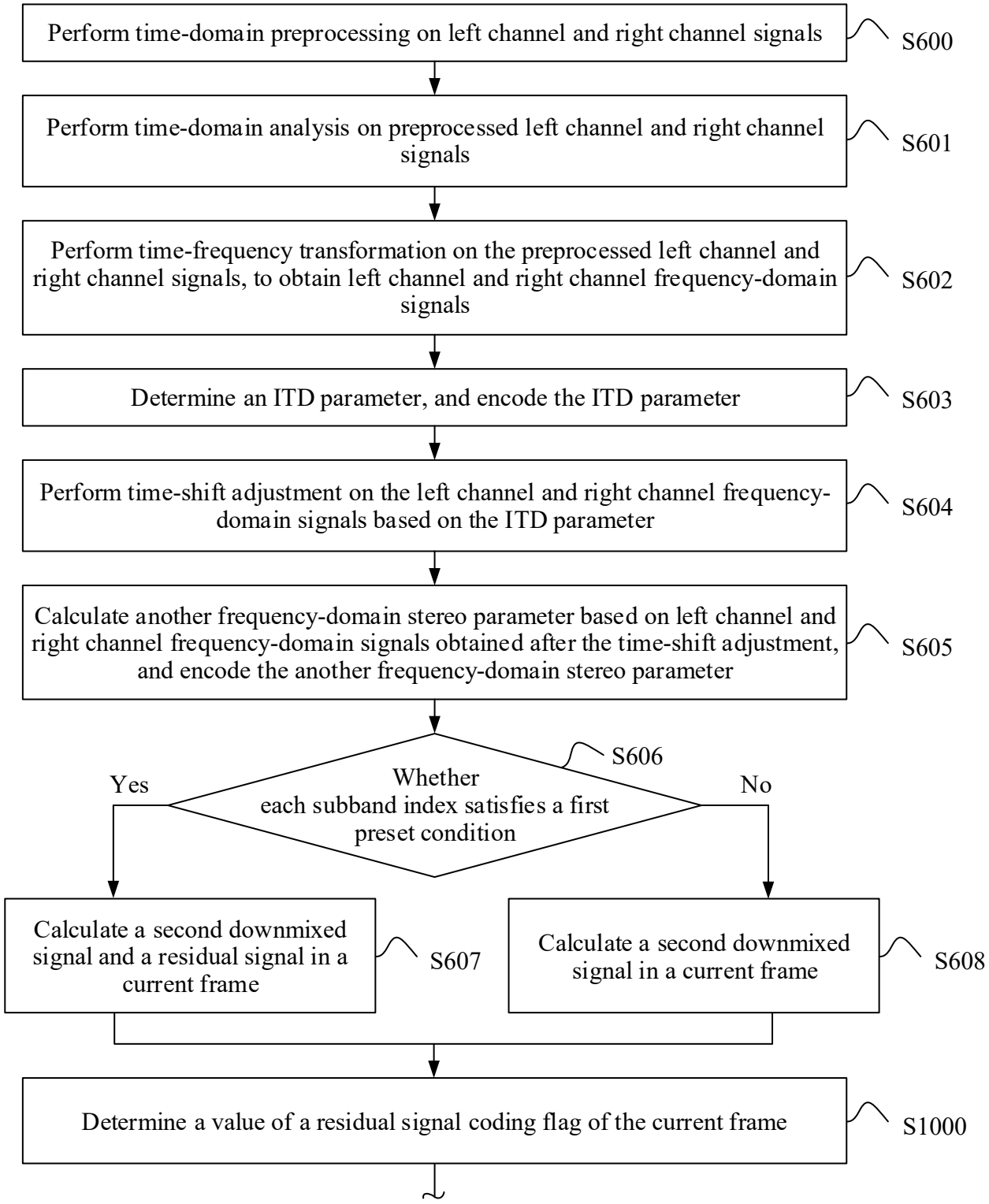

CONT.
FROM
FIG. 9A
Whether a value of a residual coding flag of a frame n–1 is equal to a value of a residual signal coding flag of a frame n–2
S900
Yes
No
Calculate a downmixed signal and a residual signal in a switching frame
S901
If a residual signal in the frame n–1 does not need to be encoded, calculate a first downmixed signal in the current frame
S902
Determine a value of a residual coding switching flag of the current frame
S704
If a residual signal in a frame previous to the current frame does not need to be encoded, transform the first downmixed signal in the current frame into a time-domain signal
S705
If a residual signal in a frame previous to the current frame needs to be encoded, a calculation apparatus transforms the residual signal in the current frame into a time-domain signal
S706

FIG. 9B



TO FIG. 10B

FIG. 10A

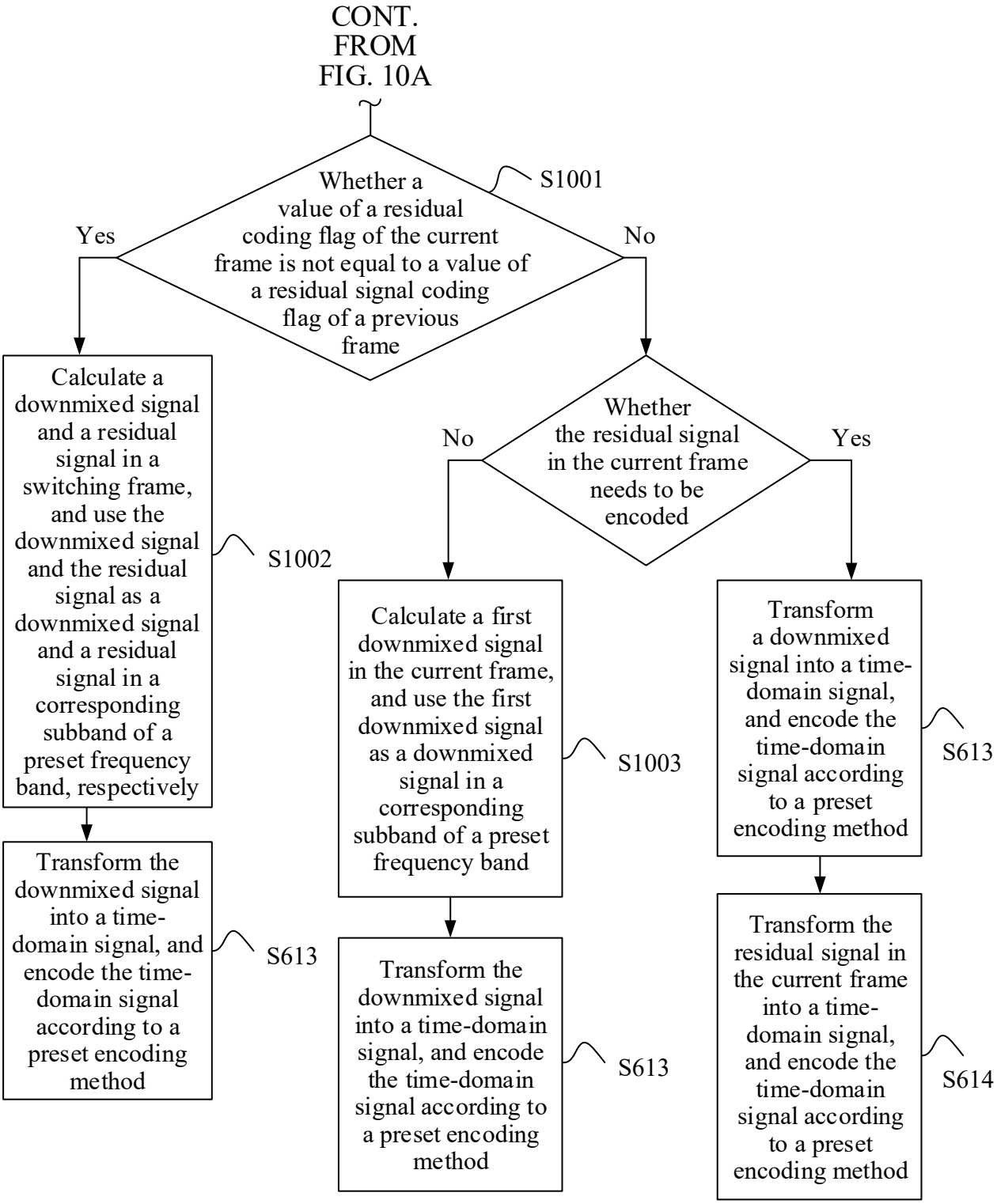

CONT. FROM FIG. 10A
Whether a value of a residual coding flag of the current frame is not equal to a value of a residual signal coding flag of a previous frame
S1001
Yes
No
Calculate a downmixed signal and a residual signal in a switching frame, and use the downmixed signal and the residual signal as a downmixed signal and a residual signal in a corresponding subband of a preset frequency band, respectively
S1002
Transform the downmixed signal into a time-domain signal, and encode the time-domain signal according to a preset encoding method
S613
Whether the residual signal in the current frame needs to be encoded
No
Yes
Calculate a first downmixed signal in the current frame, and use the first downmixed signal as a downmixed signal in a corresponding subband of a preset frequency band
S1003
Transform the downmixed signal into a time-domain signal, and encode the time-domain signal according to a preset encoding method
S613
Transform a downmixed signal into a time-domain signal, and encode the time-domain signal according to a preset encoding method
S613
Transform the residual signal in the current frame into a time-domain signal, and encode the time-domain signal according to a preset encoding method
S614

FIG. 10B

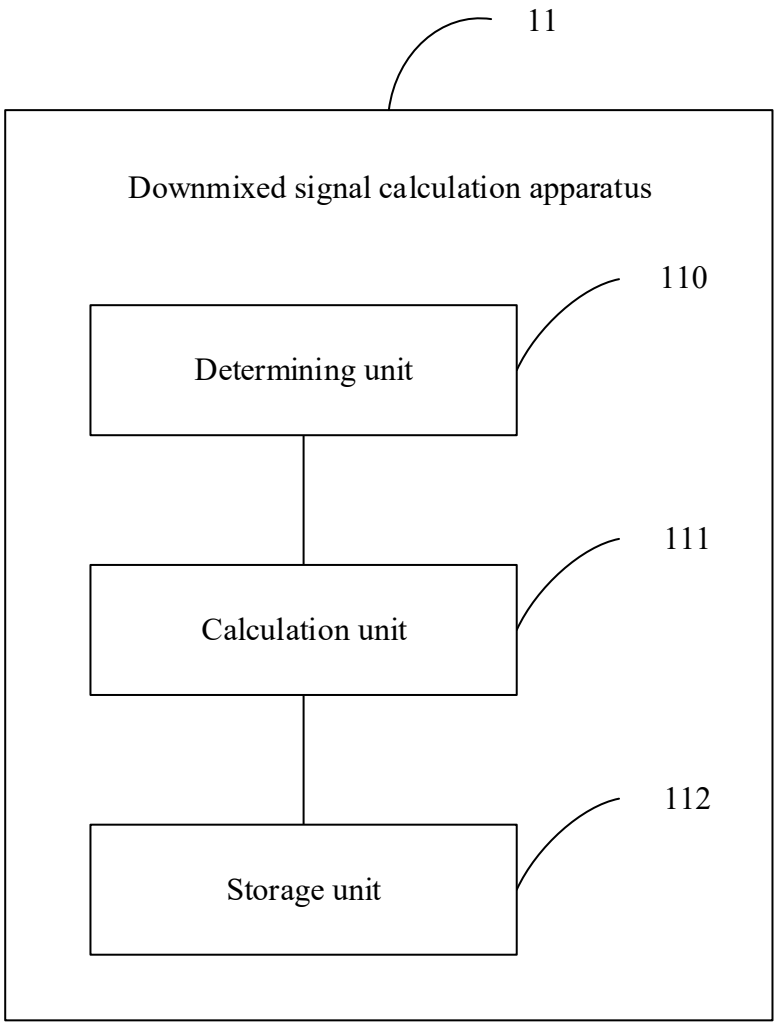

11
Downmixed signal calculation apparatus
110
Determining unit
111
Calculation unit
112
Storage unit

FIG. 11

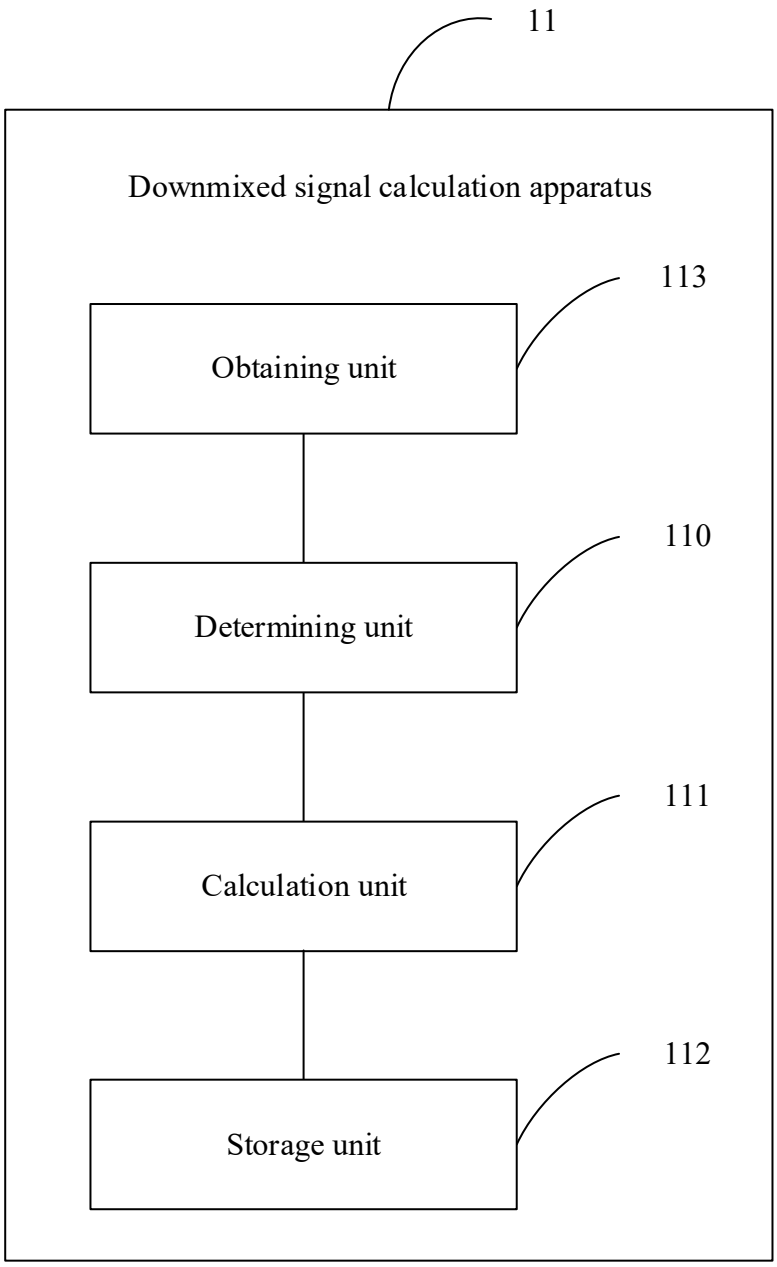

11
Downmixed signal calculation apparatus
113
Obtaining unit
110
Determining unit
111
Calculation unit
112
Storage unit

FIG. 12

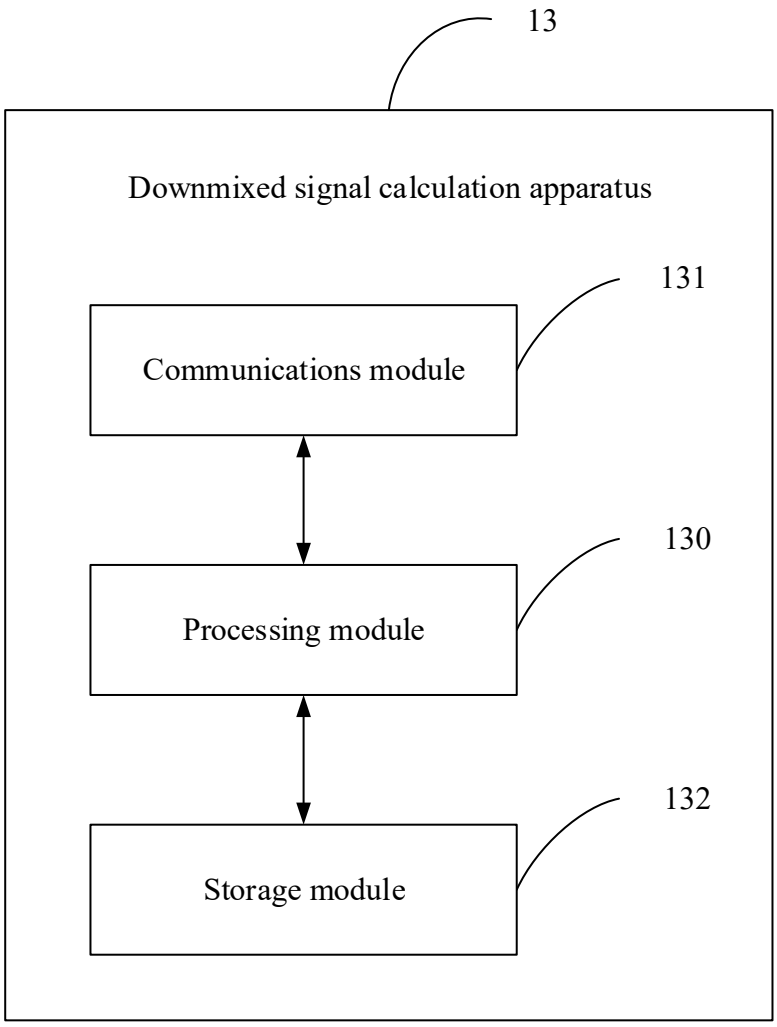

13
Downmixed signal calculation apparatus
131
Communications module
130
Processing module
132
Storage module

FIG. 13