

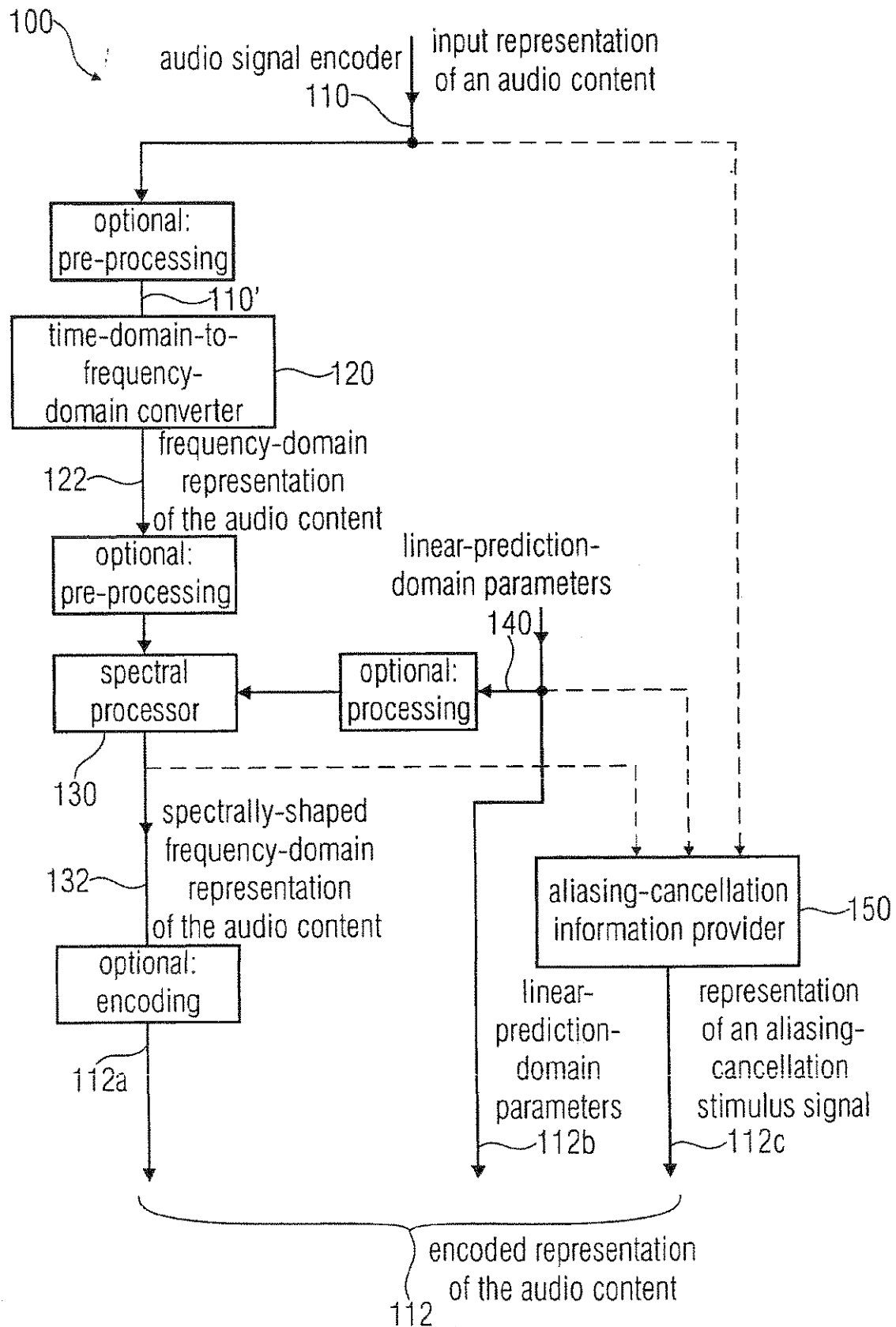


FIG 1

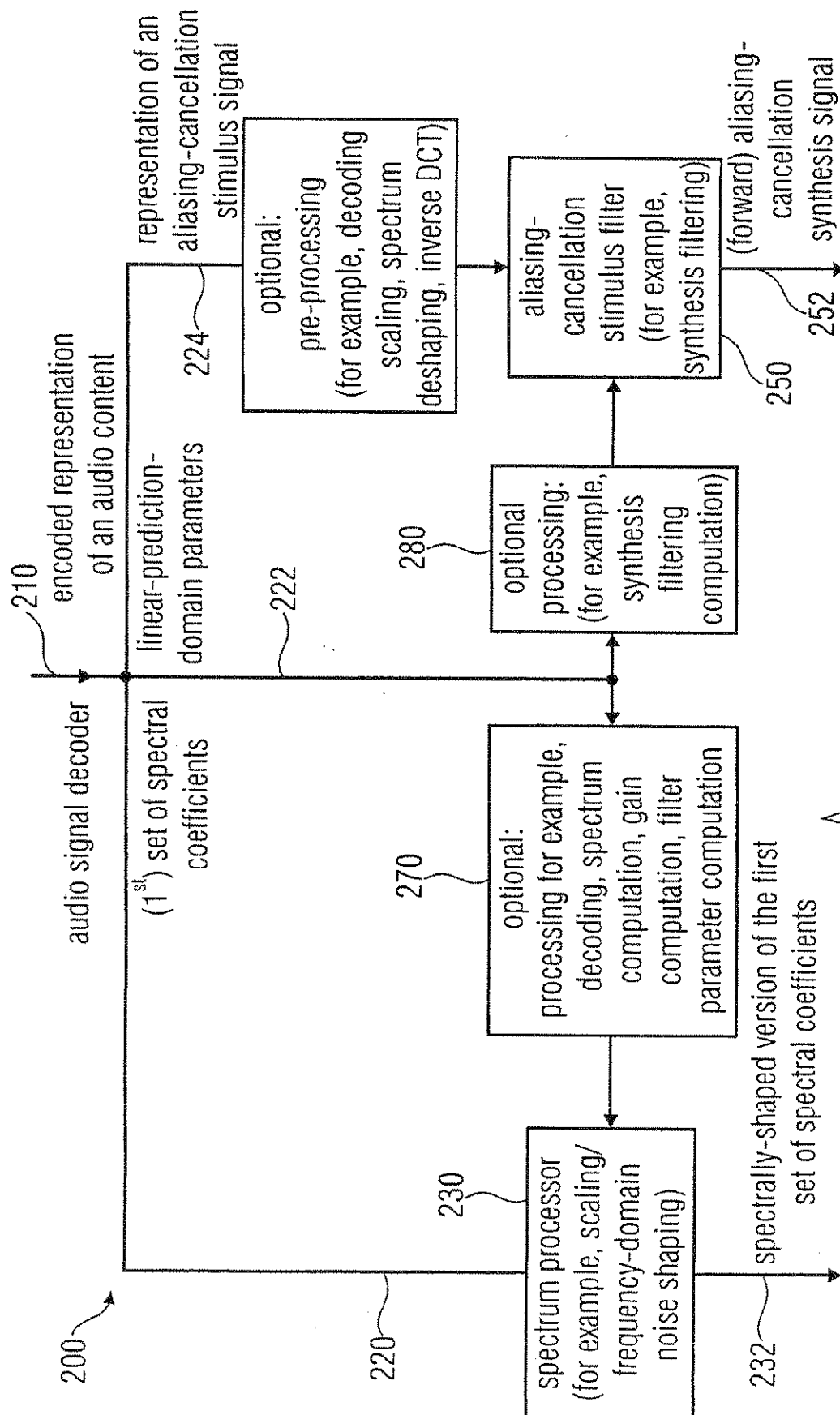


FIG 2
FIG 2A FIG 2B

FIG 2A

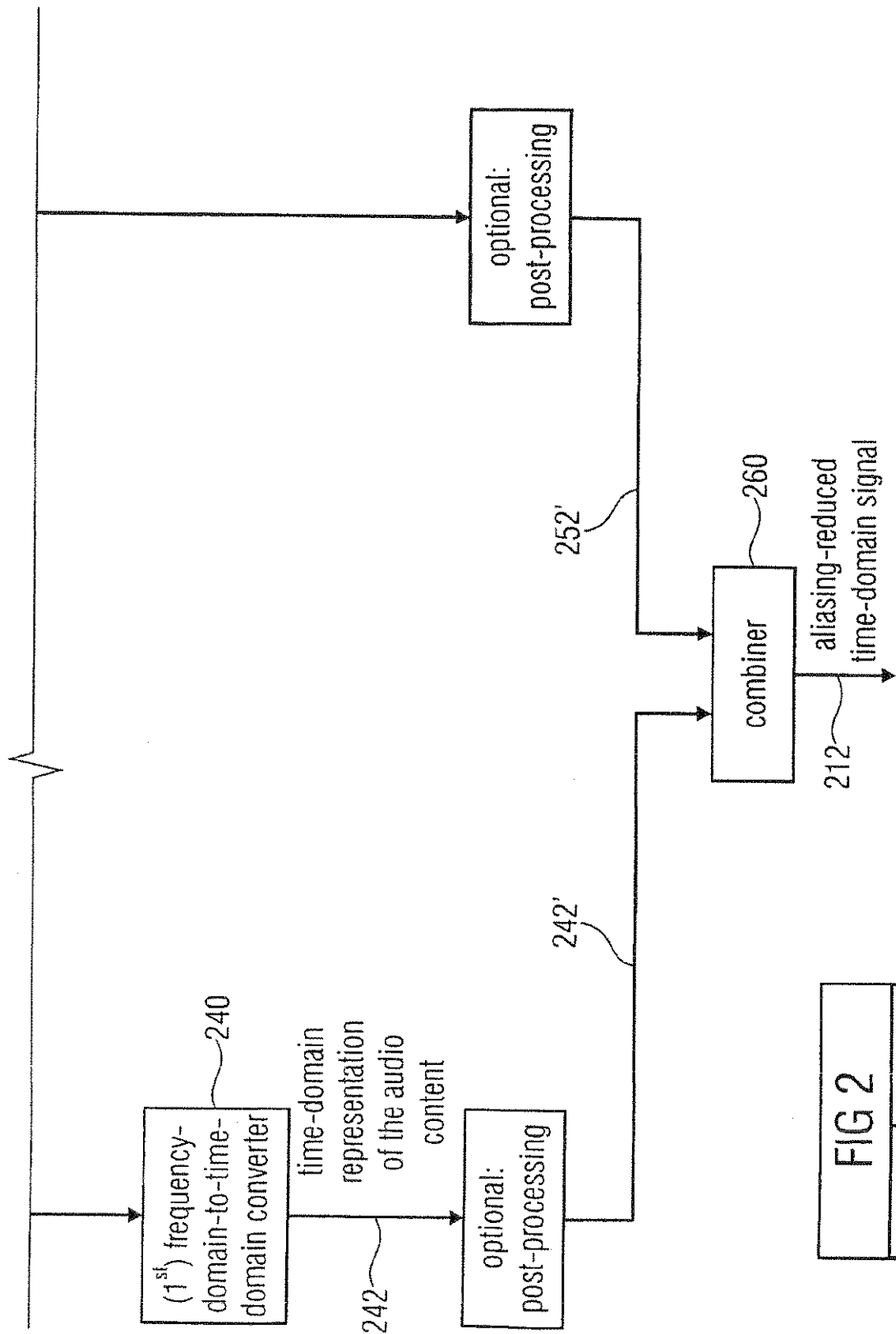
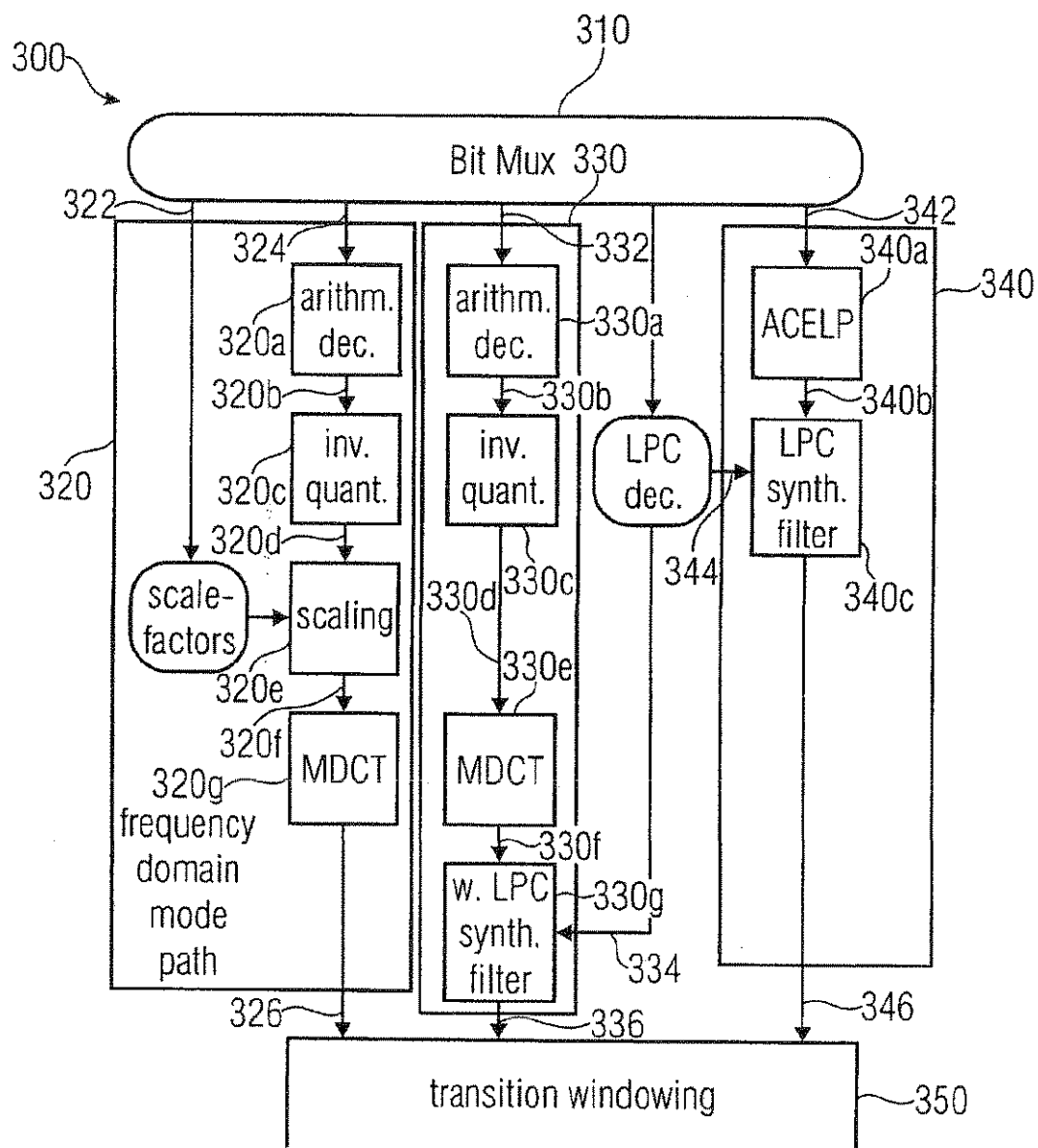


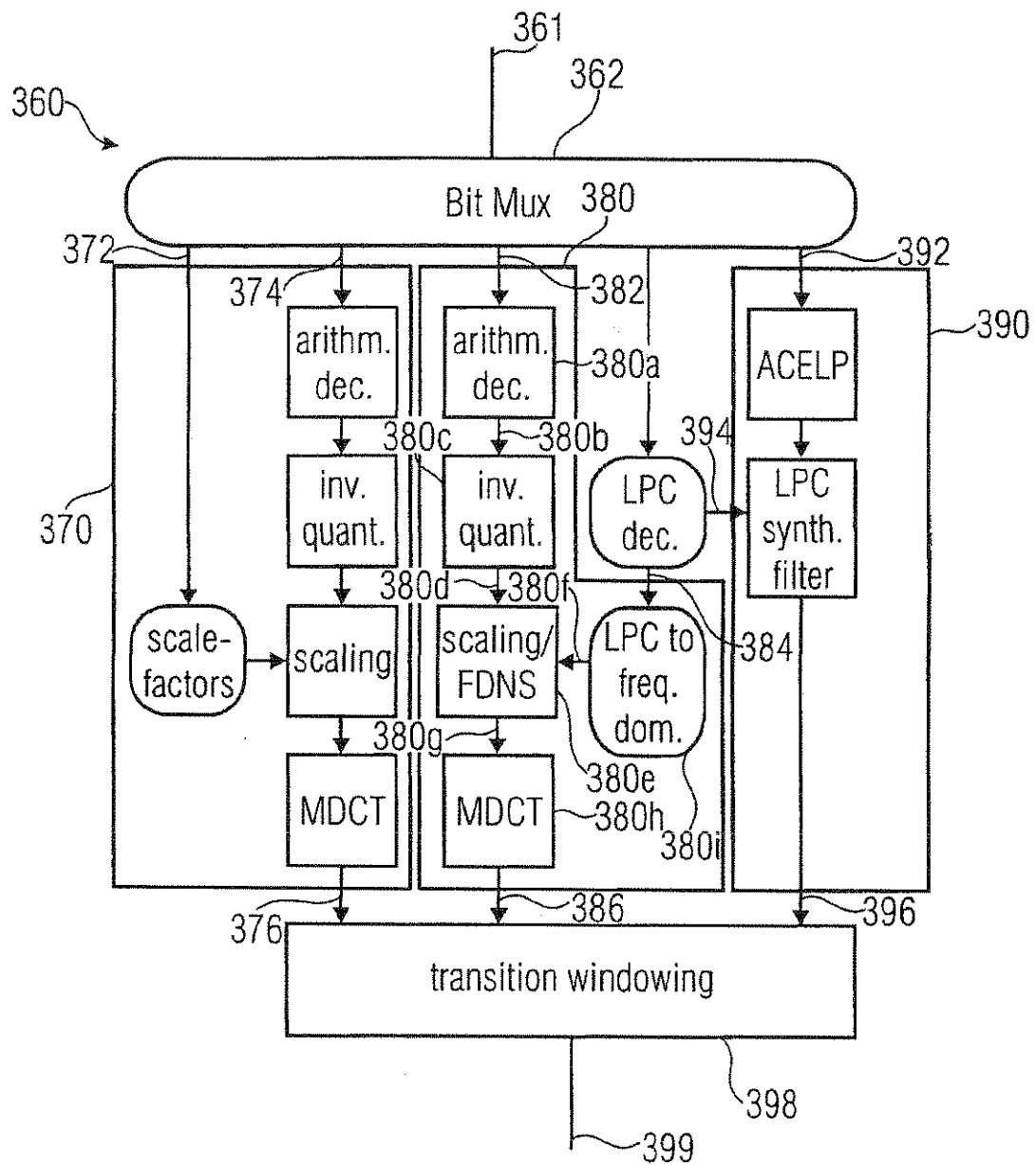
FIG 2B

FIG 2	FIG 2A	FIG 2B
-------	--------	--------



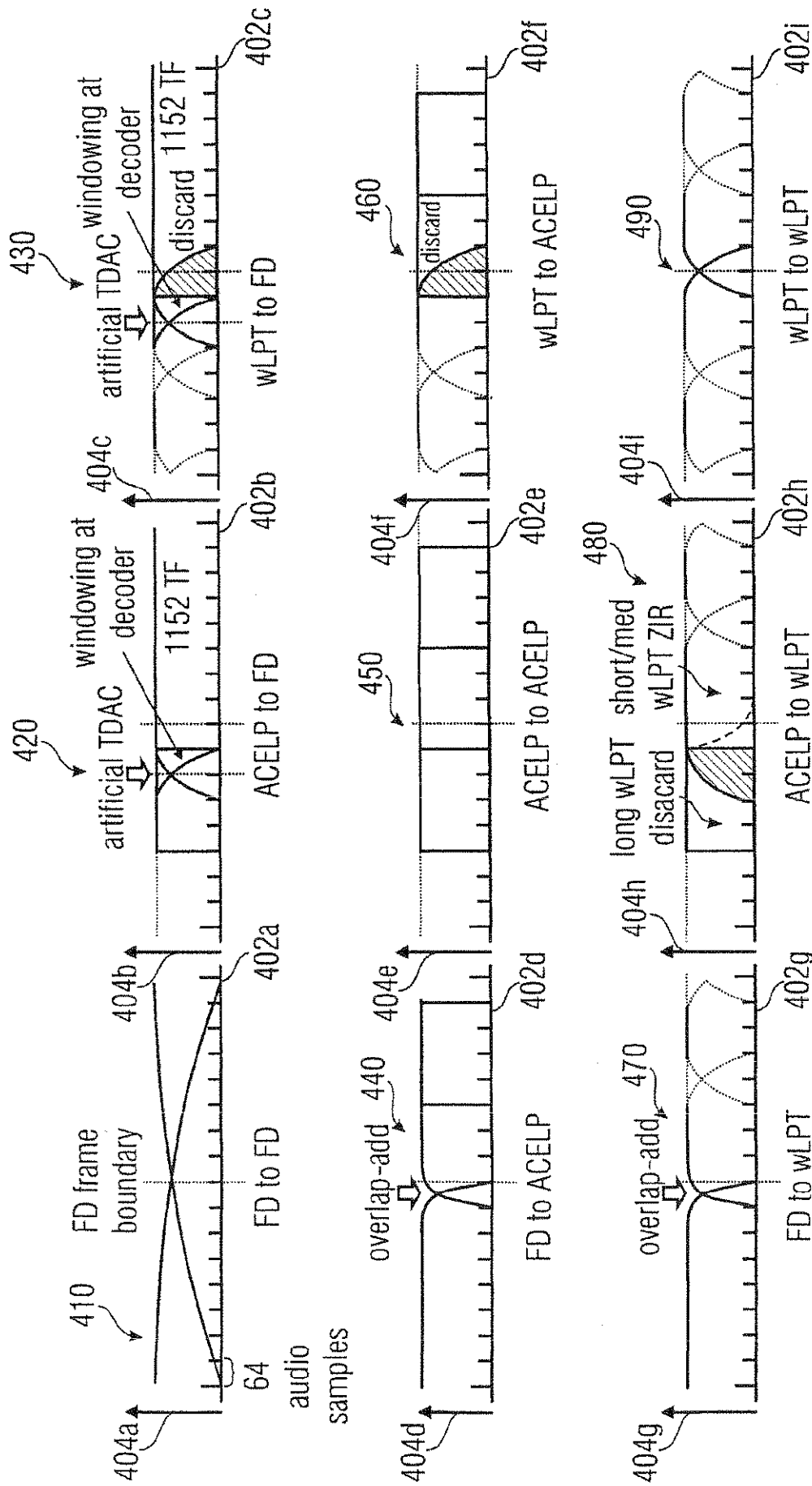
WD4 OF USAC

FIG 3A

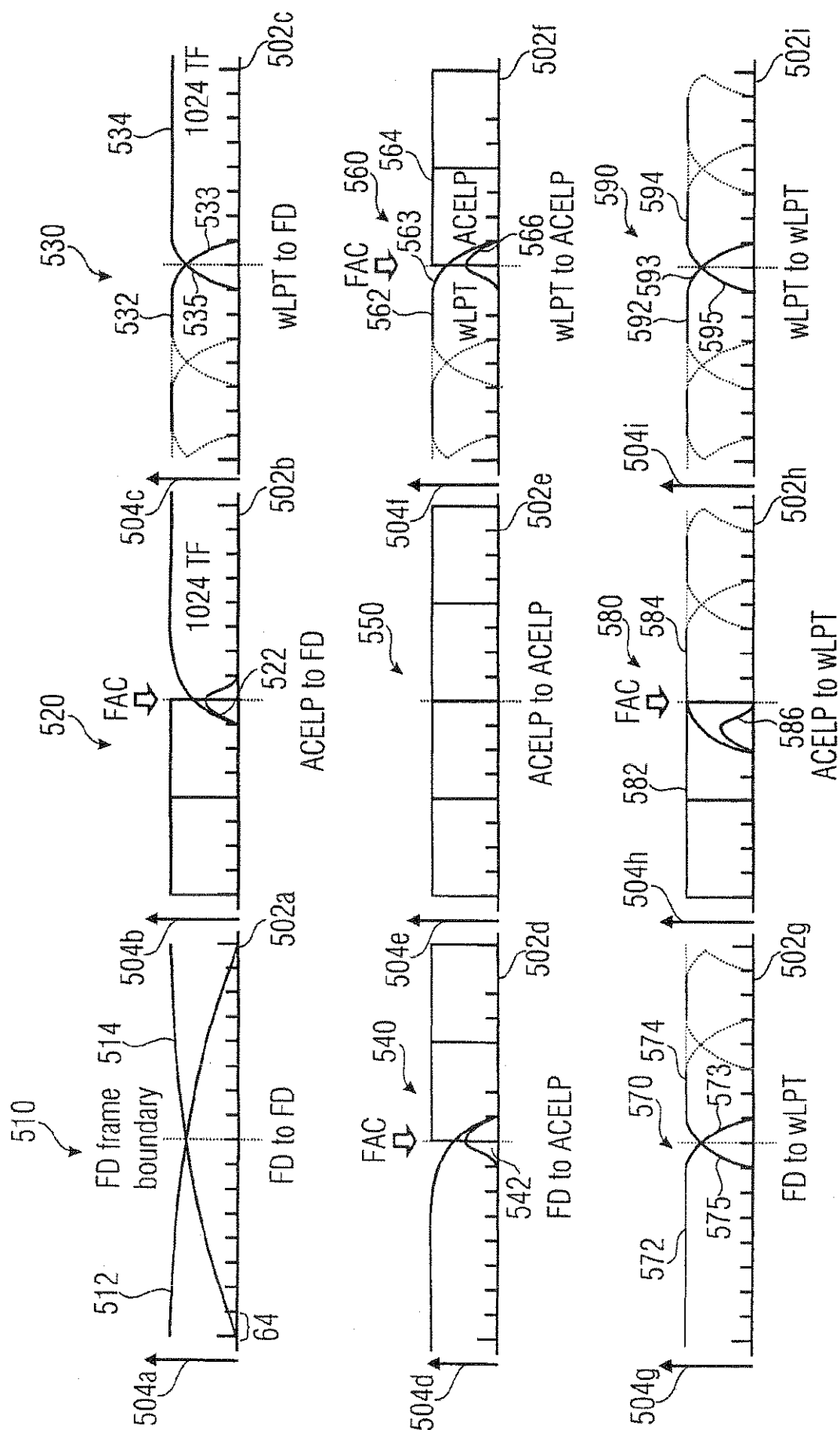


PROPOSED SYSTEM

FIG 3B



WINDOW TRANSITIONS IN WD4 OF USAC
FIG 4



555

8/30

OVERVIEW OVER ALL WINDOW TYPES

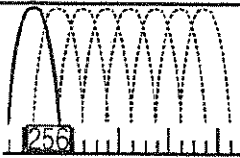
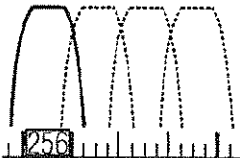
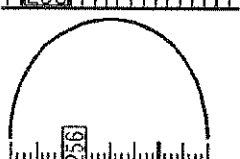
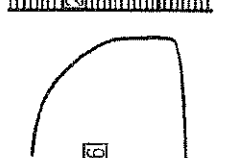
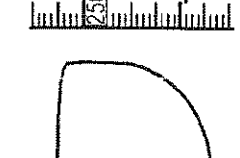
length	overlap left	TF length	overlap right	legacy name	example
	128	128	128	AAC short	
	128	256	128	TCX256	
	128	512	128	TCX512	
	128	1024	128	TCX1024 stopstart	
	1024	1024	1024	AAC long	
	1024	1024	128	AAC start	
	128	1024	1024	AAC stop	

FIG 6

9/30

ALLOWED WINDOW SEQUENCES

window sequence from ↓ to ↑	"AAC long"	"AAC start"	8 x "AAC short"	"AAC stop"	"AAC stopstart"	"LPD TCX"	"LPD ACELP"
"AAC stop"	☒	☒					
"AAC long"	☒	☒					
"AAC start"			☒	☒	☒	☒	☒ (FAC)
8 x "AAC short"			☒	☒	☒	☒	☒ (FAC)
"AAC stopstart"			☒	☒	☒	☒	☒ (FAC)
"LPD TCX"			☒	☒	☒	☒	☒ (FAC)
"LPD ACELP"			☒ (FAC)	☒ (FAC)	☒ (FAC)	☒ (FAC)	☒

FIG 7

FIG 8A

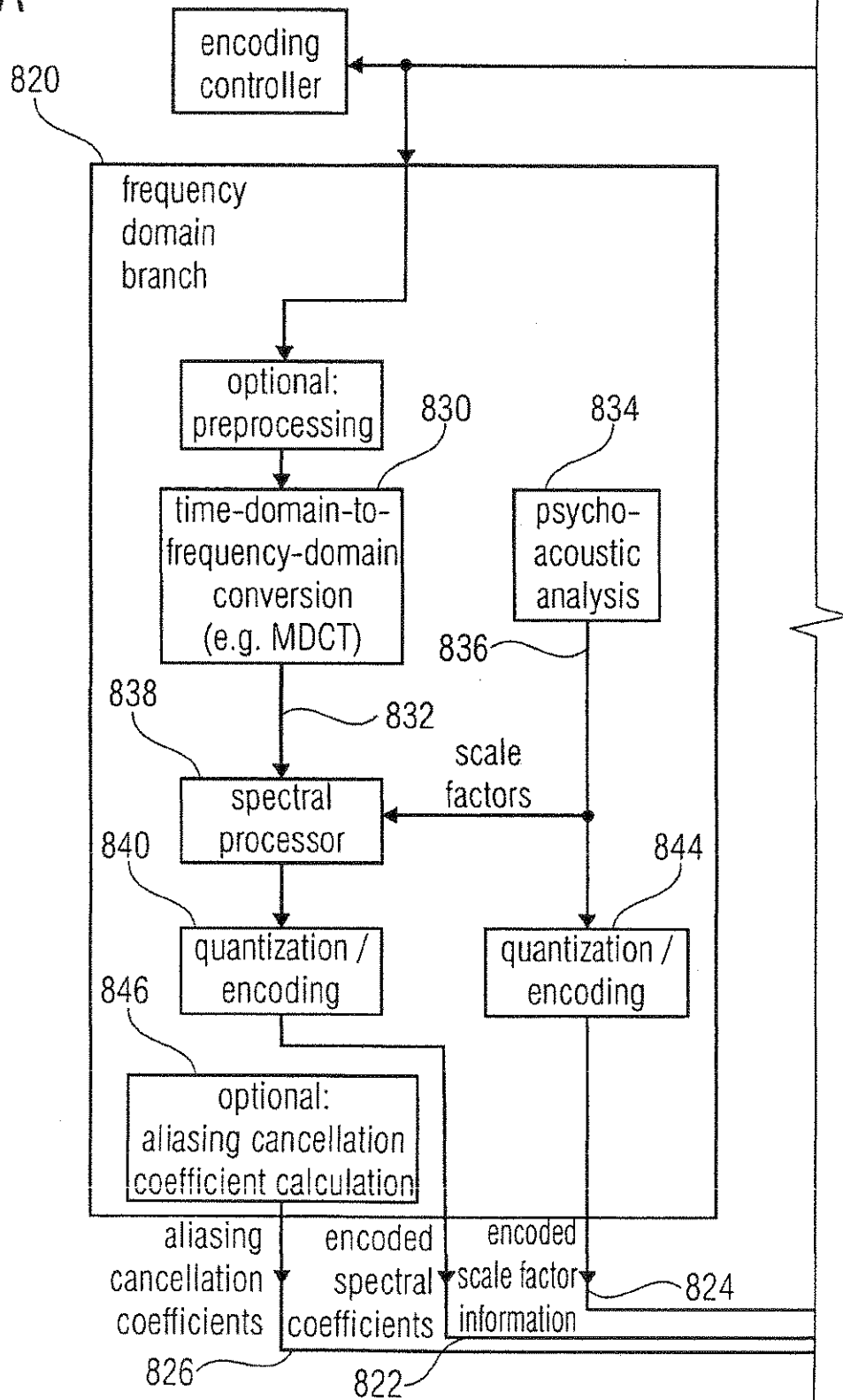


FIG 8

FIG 8A FIG 8B FIG 8C FIG 8D

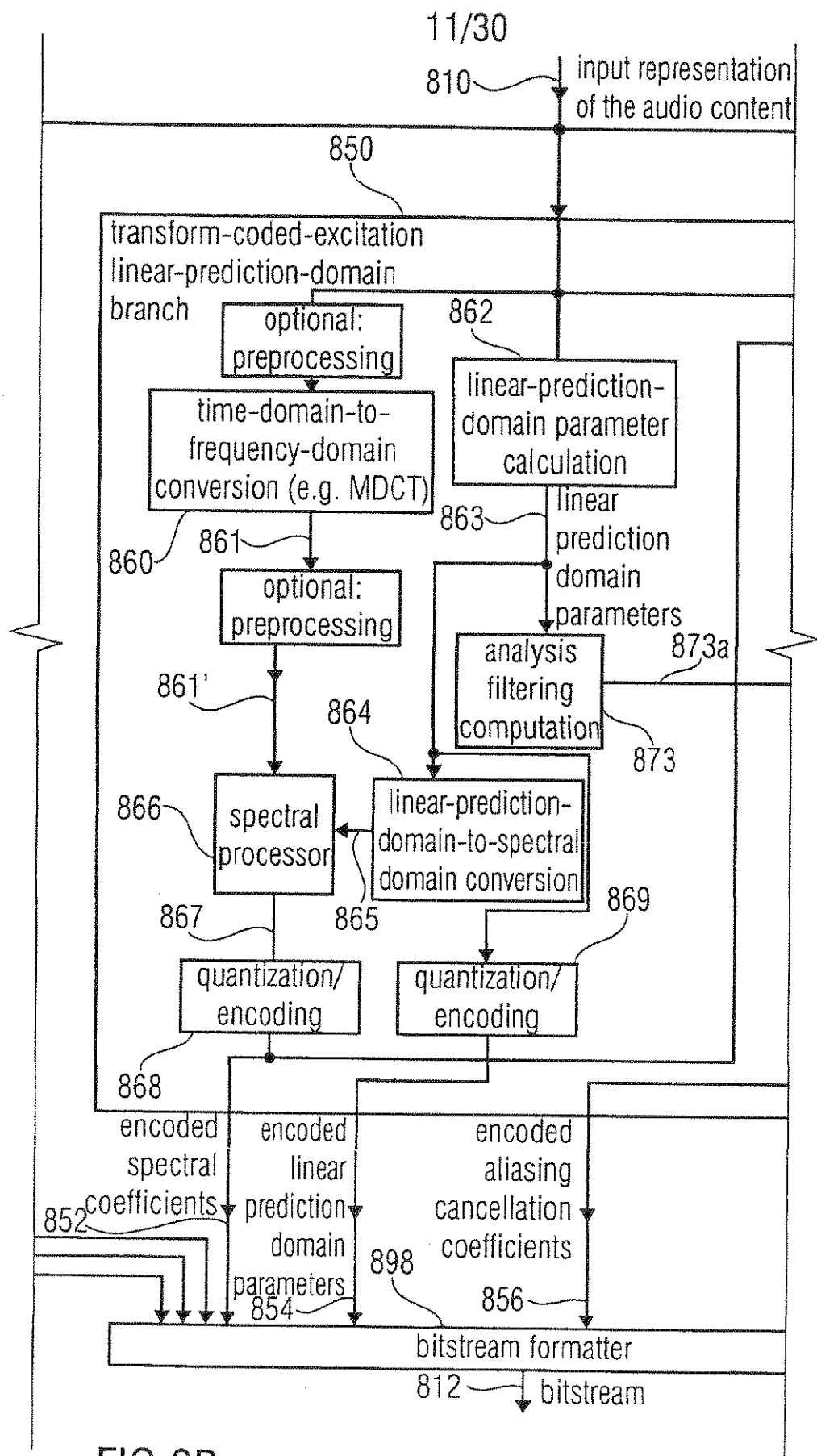
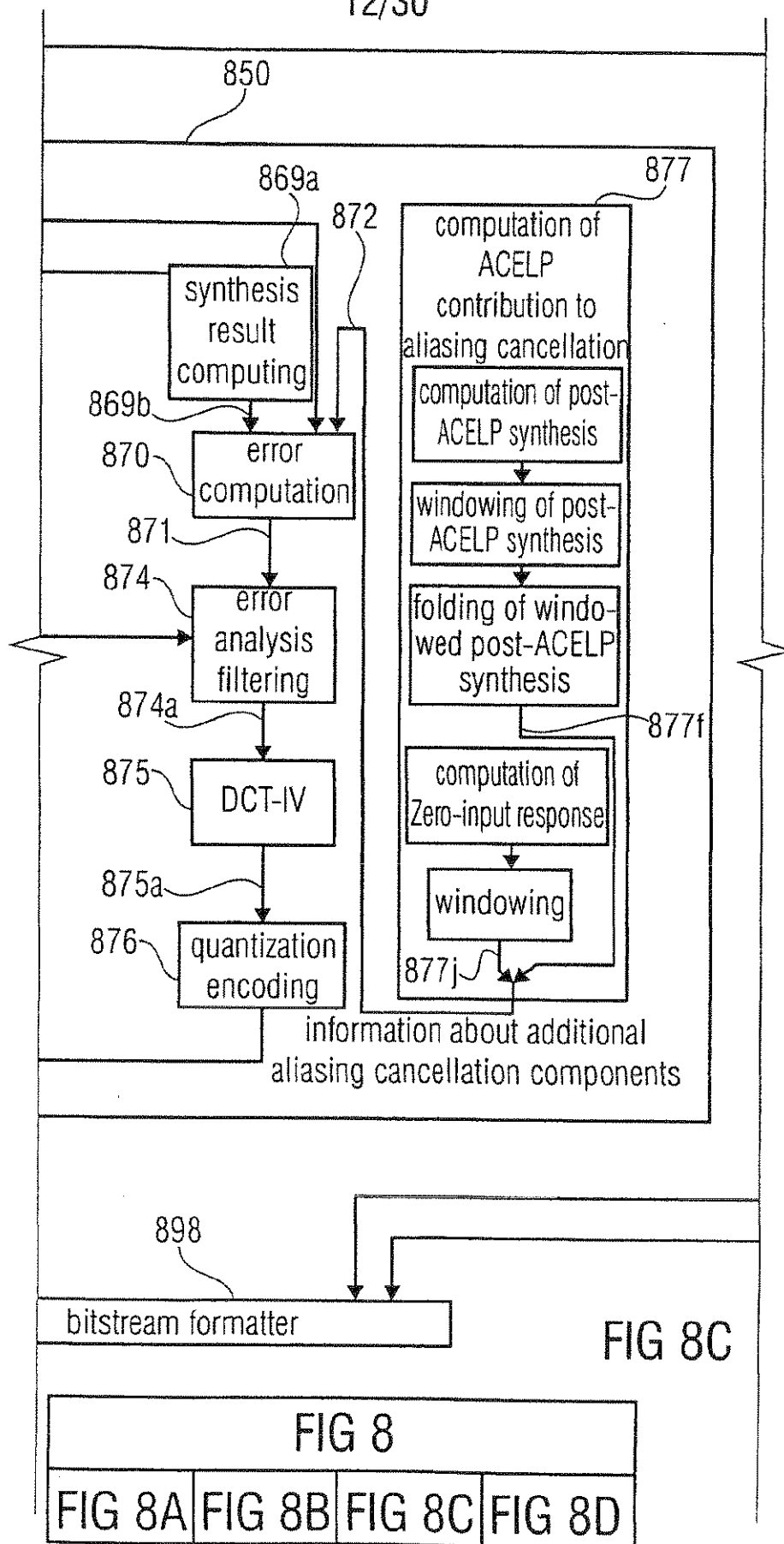


FIG 8B

FIG 8

FIG 8A FIG 8B FIG 8C FIG 8D

12/30



13/30

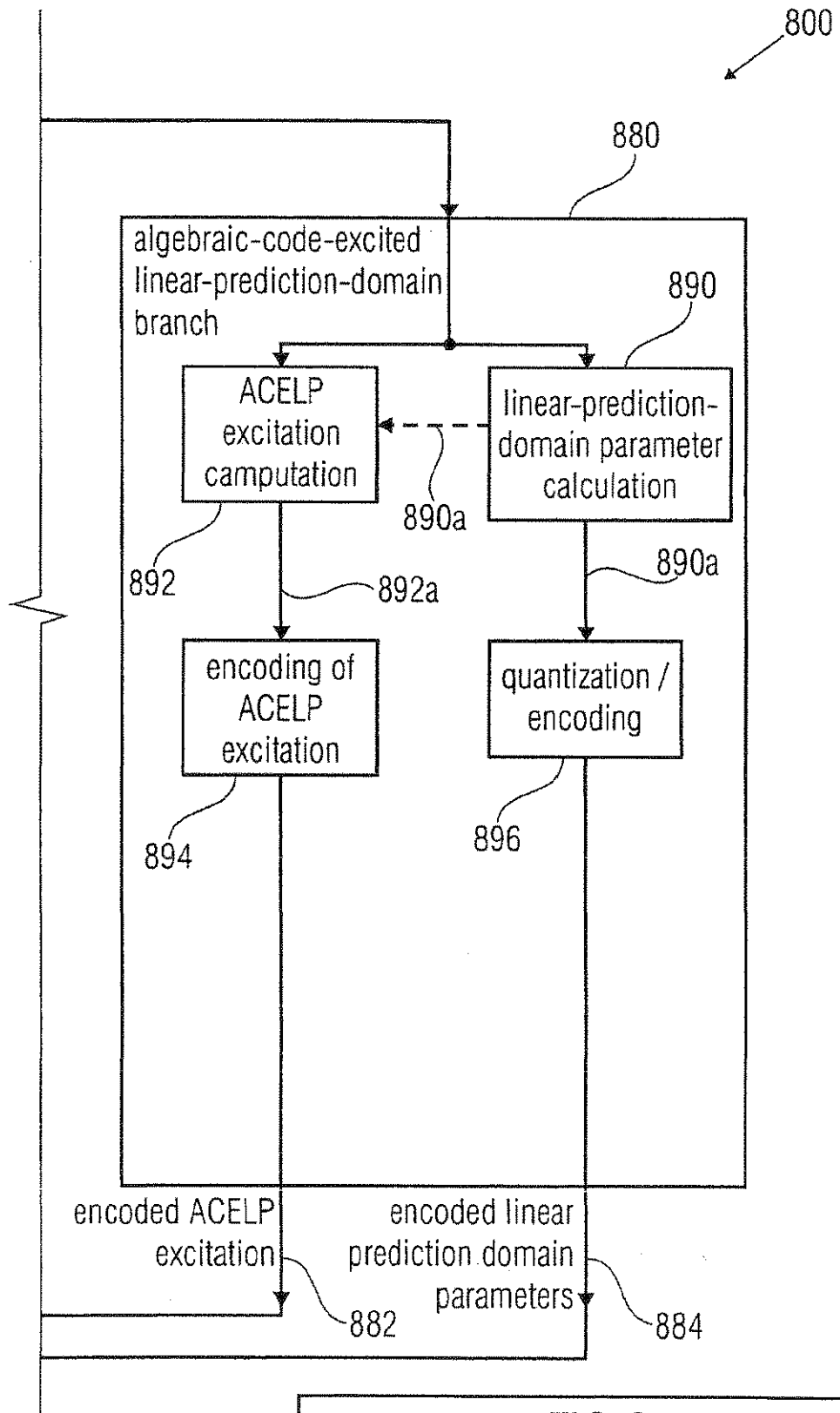


FIG 8D

FIG 8			
FIG 8A	FIG 8B	FIG 8C	FIG 8D

14/30

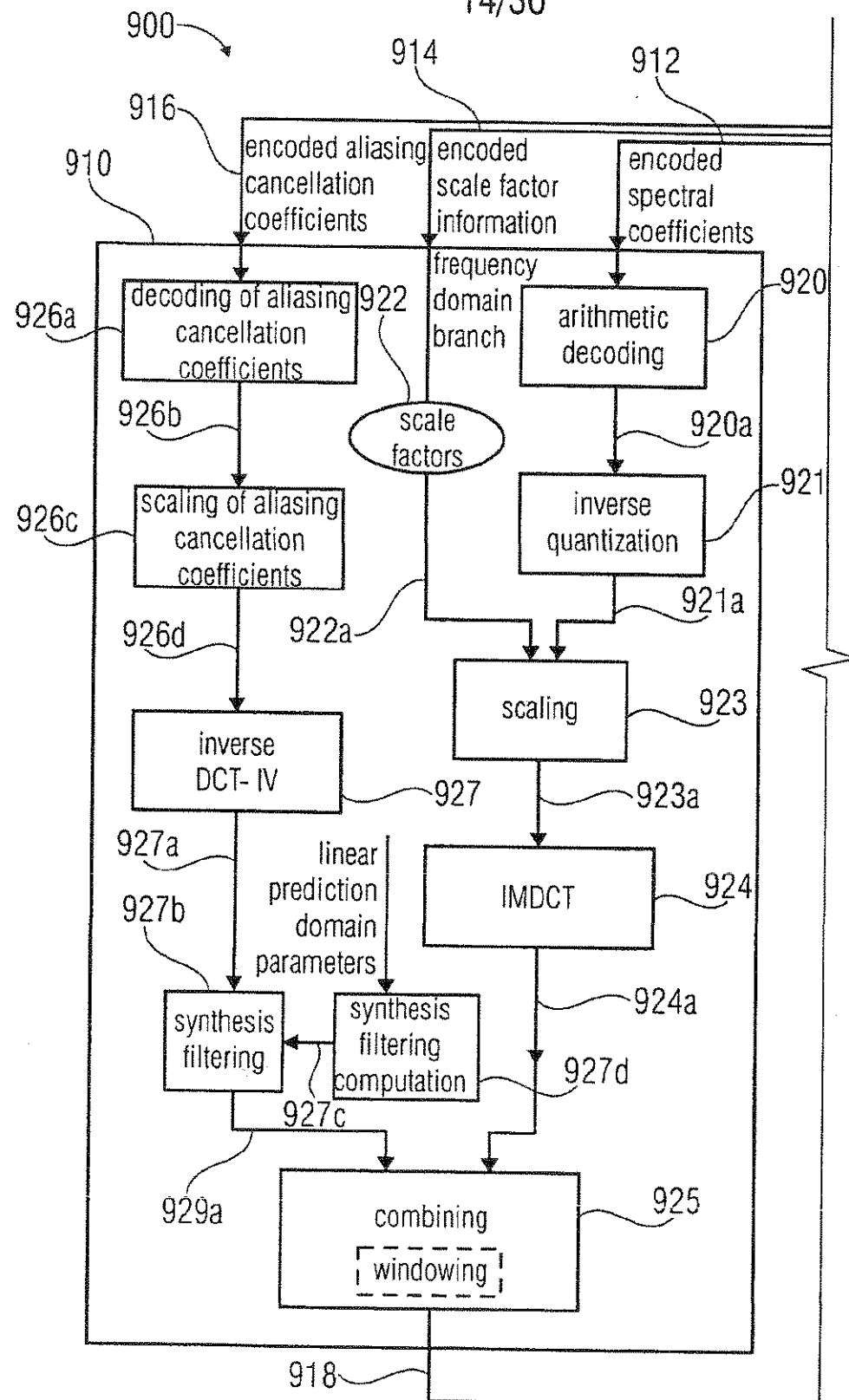


FIG 9

FIG 9A	FIG 9B	FIG 9C	FIG 9D
--------	--------	--------	--------

FIG 9A

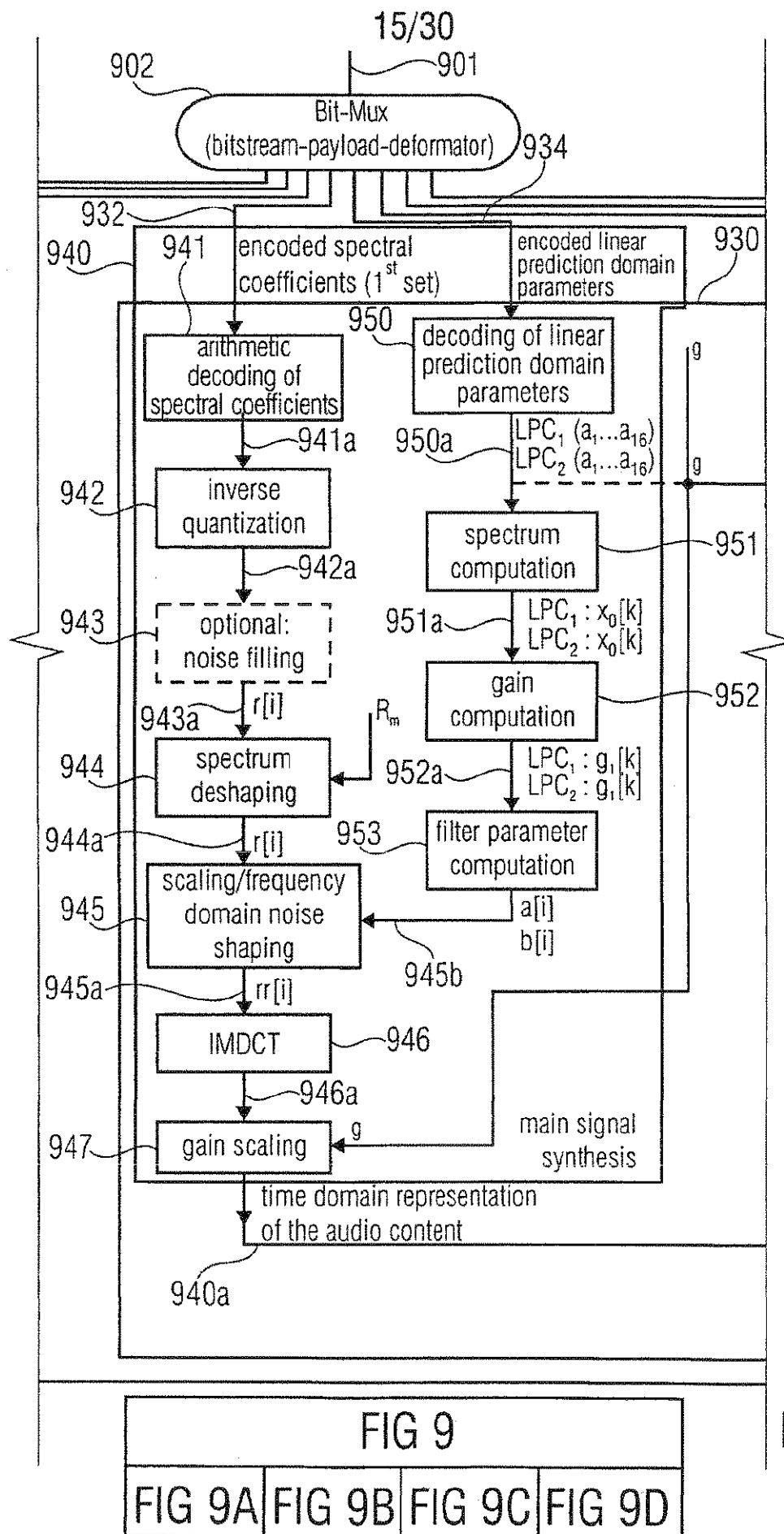


FIG 9B

16/30

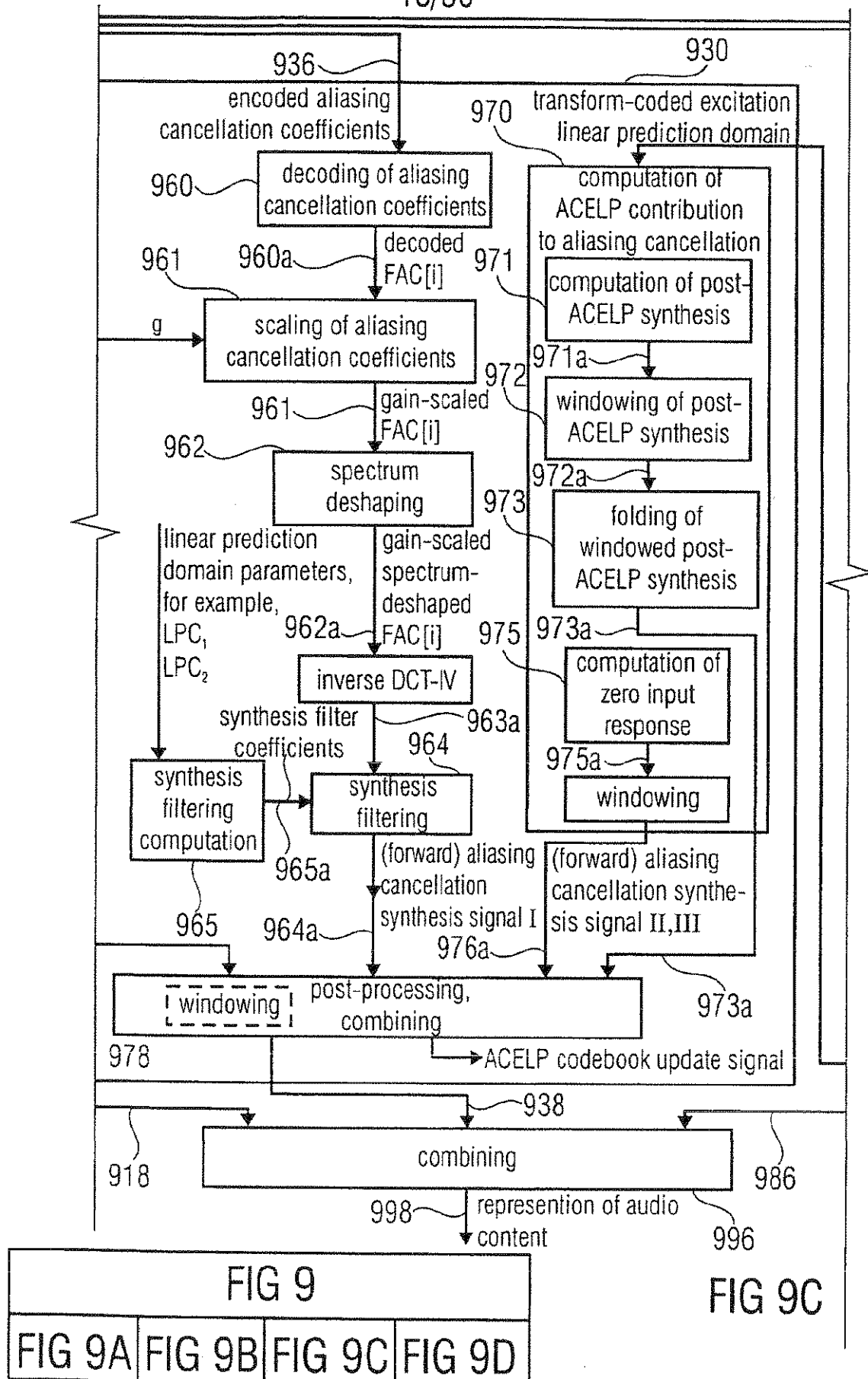


FIG 9

FIG 9C

FIG 9A	FIG 9B	FIG 9C	FIG 9D
--------	--------	--------	--------

17/30

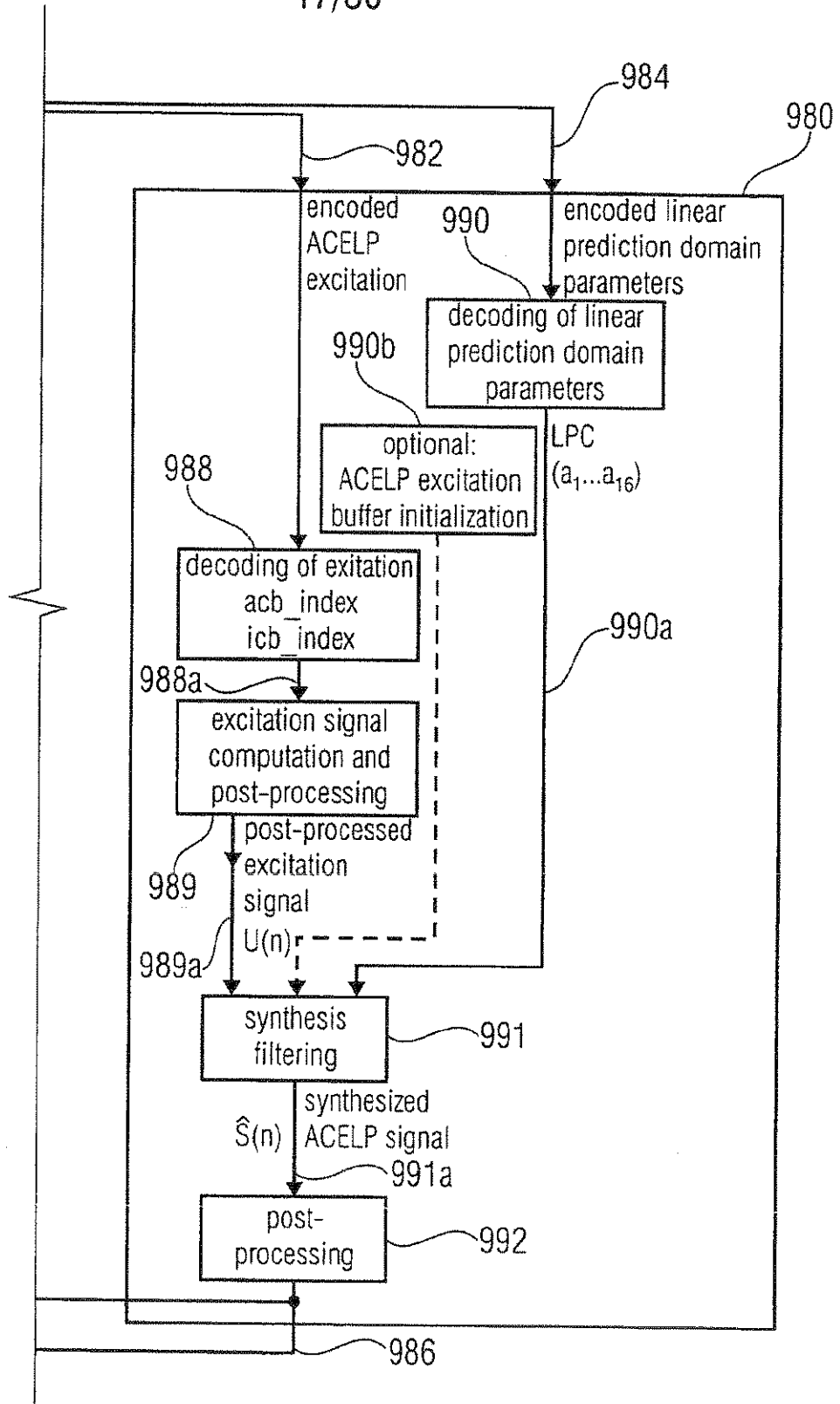


FIG 9			
FIG 9A	FIG 9B	FIG 9C	FIG 9D

FIG 9D

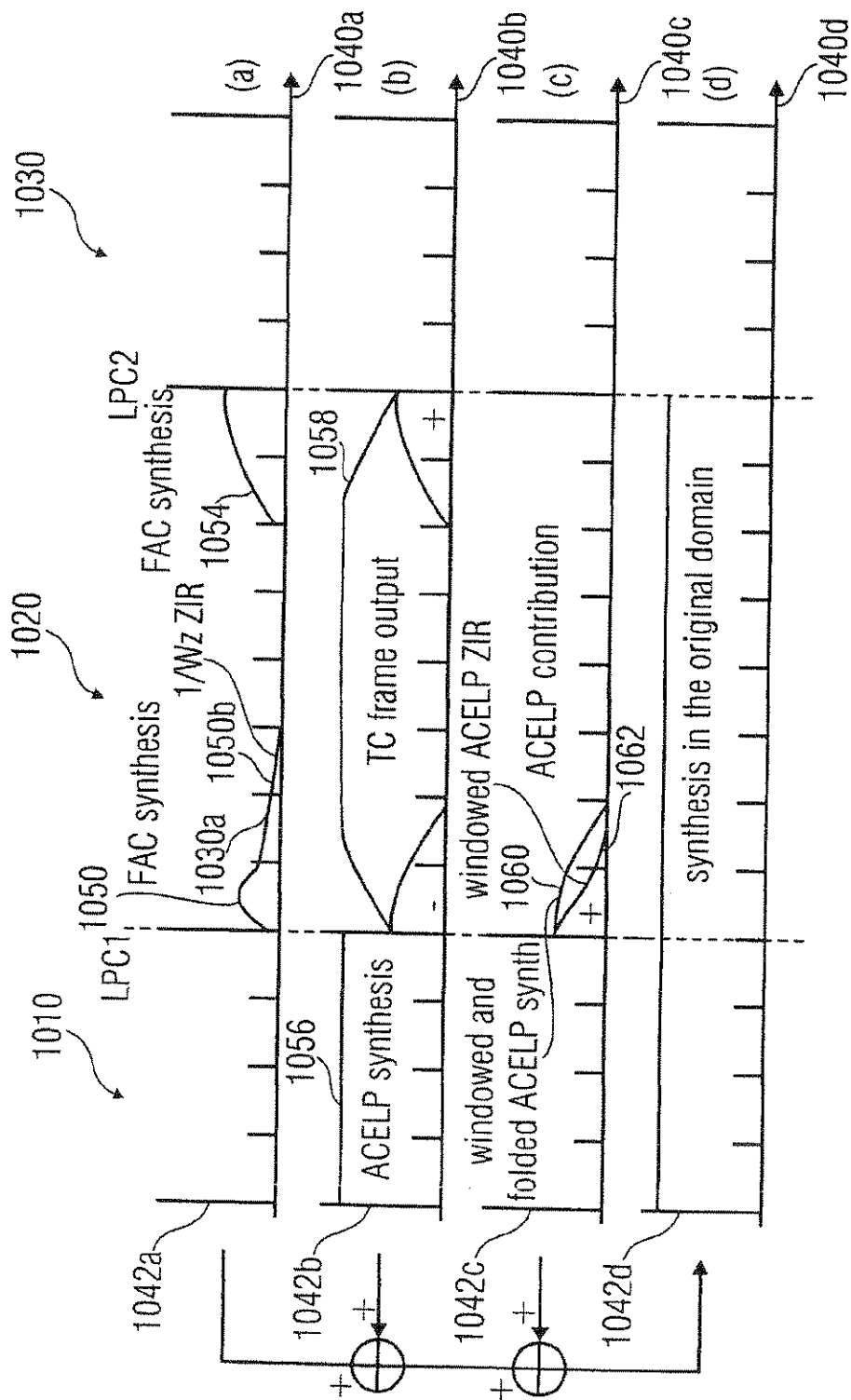
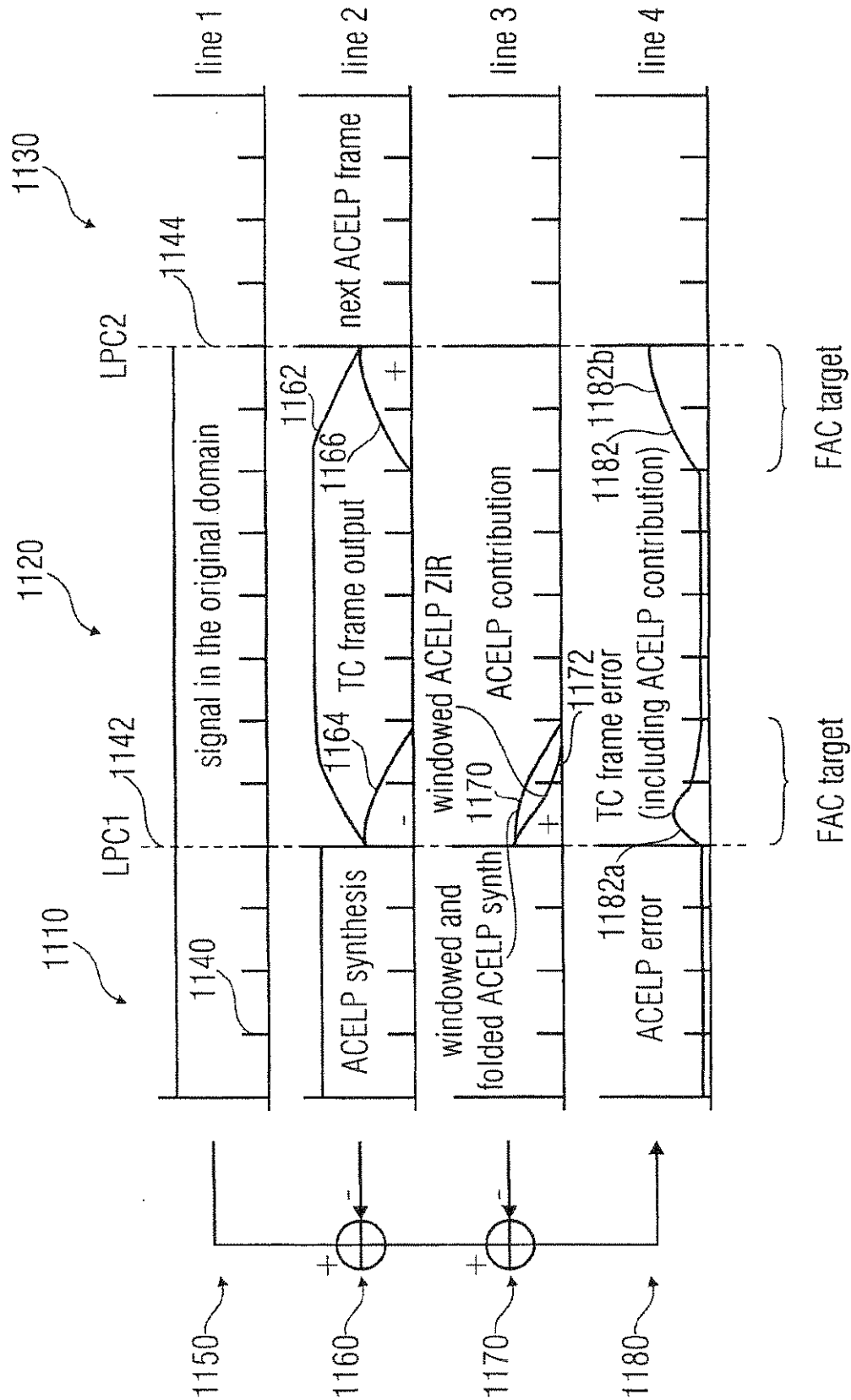


FIG 10



COMPUTATION OF FAC TARGET AT THE ENCODER

FIG 11

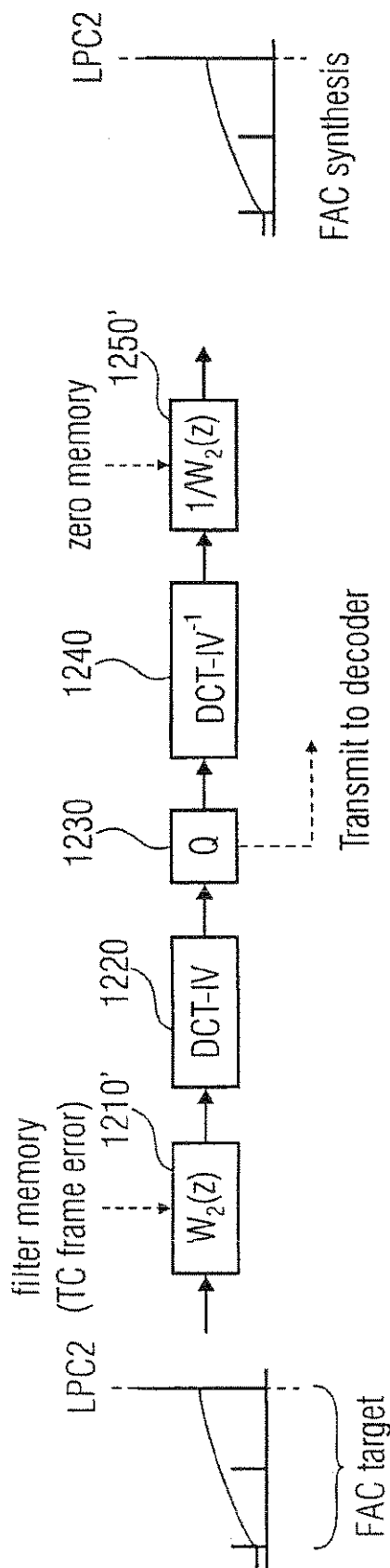
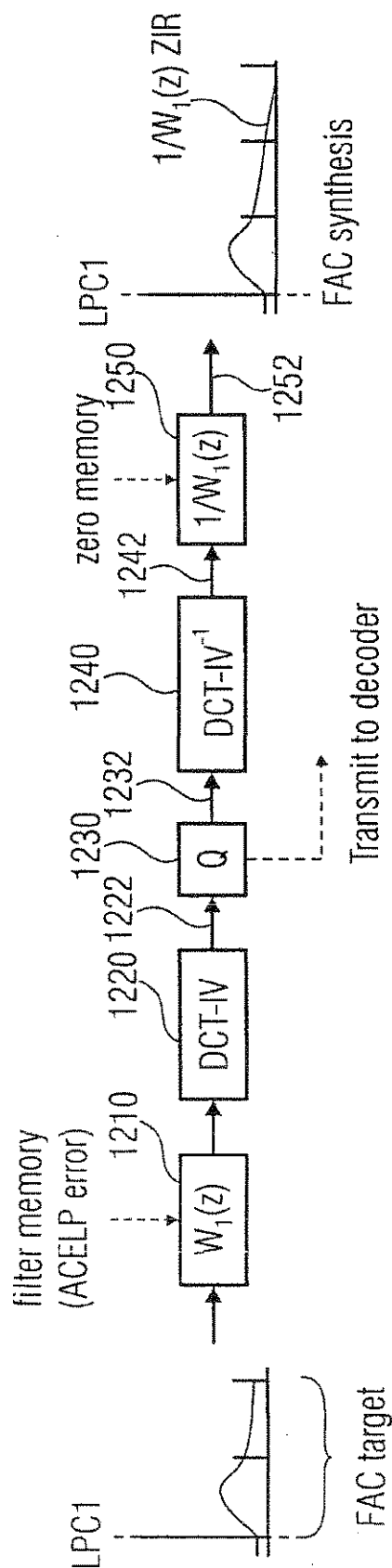
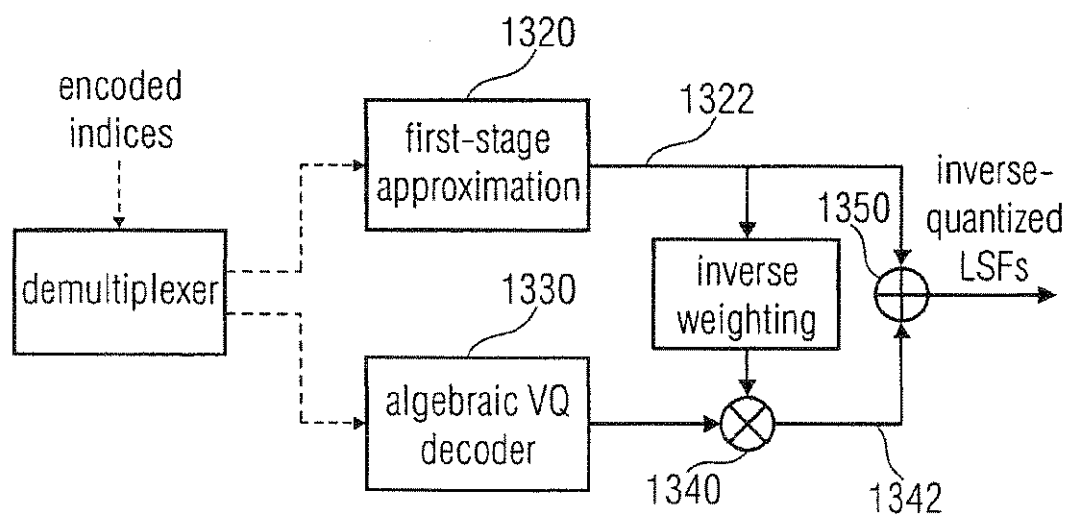


FIG 12

CONDITIONS FOR THE PRESENCE
OF A GIVEN LPC FILTER IN THE BITSTREAM

LPC filter	present if
LPC 0	first_lpd_flag=1
LPC 1	$\text{mod}[0] < 2$
LPC 2	$\text{mod}[2] < 3$
LPC 3	$\text{mod}[2] < 2$
LPC 4	always

TABLE 1



PRINCIPLE OF THE WEIGHTED ALGEBRAIC
LPC INVERSE QUANTIZER

FIG 13

POSSIBLE ABSOLUTE AND RELATIVE
QUANTIZATION MODES AND CORRESPONDING BITSTREAM
SIGNALLING OF MODE_LPC

filter	quantization mode	mode_lpc	binary code
LPC4	absolute	0	(none)
LPC0	absolute	0	0
	relative LPC4	1	1
LPC2	absolute	0	0
	relative LPC4	1	1
LPC1	absolute	0	10
	relative to $(LPC0 + LPC2)/2$ (Note 1)	1	11
	relative LPC2	2	0
LPC3	absolute	0	10
	relative $(LPC2 + LPC4)/2$	1	0
	relative LPC2	2	110
	relative LPC4	3	111
Note 1: in this mode, there is no second-stage AVQ quantizer			

TABLE 2

23/30

CODING MODES FOR CODEBOOK NUMBERS n_k

filter	quantization mode	n_k mode
LPC4	absolute	0
LPC0	absolute	0
	relative LPC4	3
LPC2	absolute	0
	relative LPC4	3
LPC1	absolute	0
	relative (LPC0+LPC2)/2	1
	relative LPC2	2
LPC3	absolute	0
	relative (LPC2+LPC4)/2	1
	relative LPC2	2
	relative LPC4	2

TABLE 3

NORMALIZATION FACTOR W FOR AVQ QUANTIZATION

filter	quantization mode	W
LPC4	absolute	60
LPC0	absolute	60
	relative LPC4	63
LPC2	absolute	60
	relative LPC4	63
LPC1	absolute	60
	relative (LPC0+LPC2)/2	65
	relative LPC2	64
LPC3	absolute	60
	relative (LPC2+LPC4)/2	65
	relative LPC2	64
	relative LPC4	64

TABLE 4

MEAN EXCITATION ENERGY $\bar{E}$

mean_energy	decoded mean excitation energy, $\bar{E}$
0	18 dB
1	30 dB
2	42 dB
3	54 dB

TABLE 5

NUMBER OF SPECTRAL COEFFICIENTS
AS A FUNCTION OF MOD[]

value of mod[x]	number lg of spectral coefficients	ZL	L	M	R	ZR
1	256	0	256	0	256	0
2	512	128	256	256	256	128
3	1024	384	256	768	256	384

TABLE 6

MAPPING OF CODING MODES FOR LPD_CHANNEL_STREAM()

lpd_mode	meaning of bits in bit-field mode					remaining mod[] enties
	bit 4	bit 3	bit 2	bit 1	bit 0	
0..15	0	mod[3]	mod[2]	mod[1]	mod[0]	
16..19	1	0	0	mod[3]	mod[2]	mod[1] = 2 mod[0] = 2
20..23	1	0	1	mod[1]	mod[0]	mod[3] = 2 mod[2] = 2
24	1	1	0	0	0	mod[3] = 2 mod[2] = 2 mod[1] = 2 mod[0] = 2
25	1	1	0	0	1	mod[3] = 3 mod[2] = 3 mod[1] = 3 mod[0] = 3
26..31						reserved

TABLE 7

26/30

CODING MODES INDICATED BY MOD[]

value of mod[x]	coding mode in frame	bitstream element
0	ACELP	acelp_coding()
1	one frame of TCX	tcx_coding()
2	TCX covering half a superframe	tcx_coding()
3	TCX covering entire a superframe	tcx_coding()

TABLE 8

SYNTAX OF FD_CHANNEL_STREAM()

Syntax	No. of bits	Mnemonic
fd_channel_stream(common_window,	core_mode_last)	
{		
global_gain;	8	uimbsf
scale_factor_data();	1	uimbsf
ac_spectral_data();		
if(core_mode_last==1 && last_lpd_mode==0) {		
fac_data(1)		
}		
}		

FIG 14

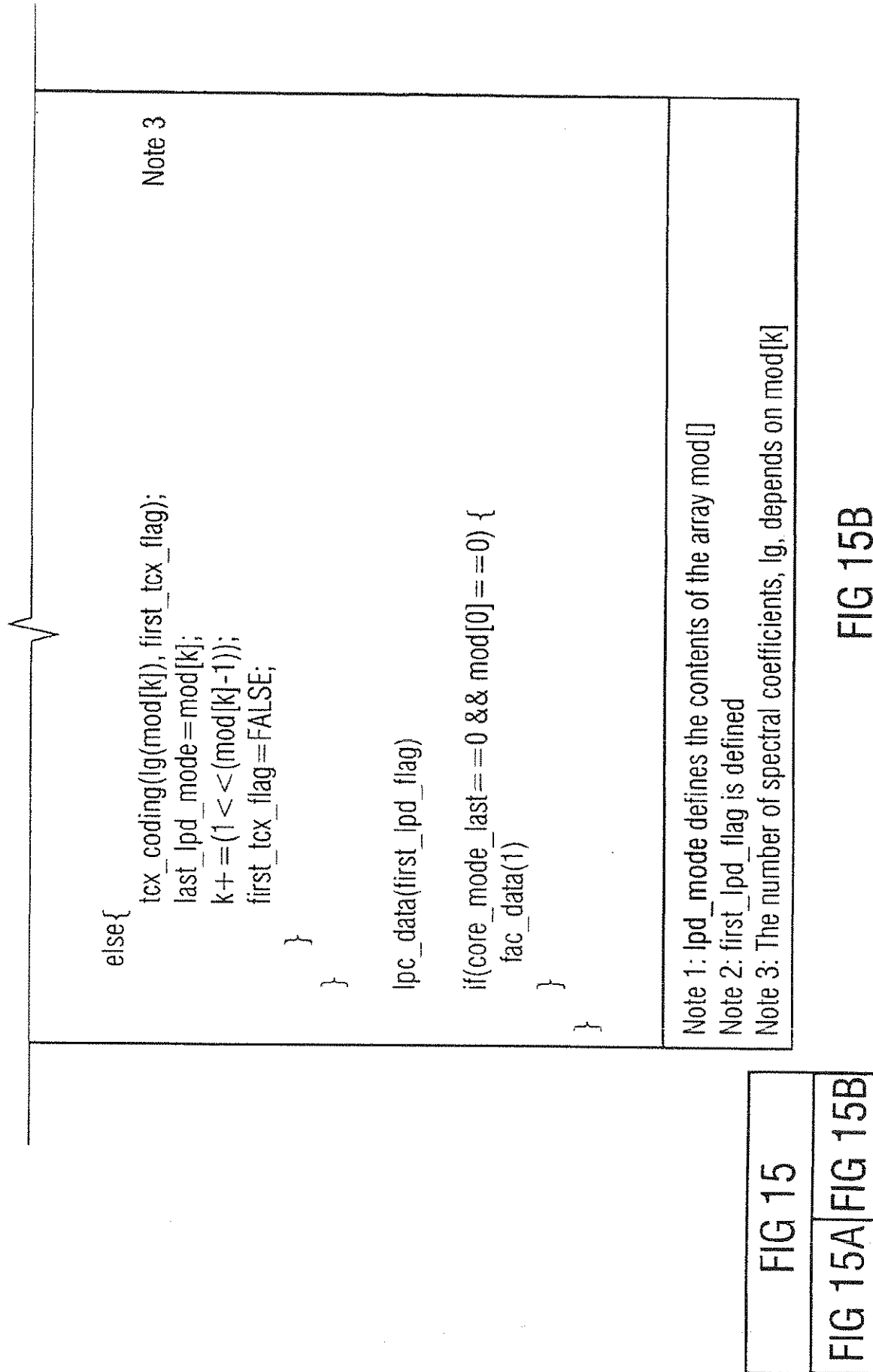
SYNTAX OF LPD_CHANNEL_STREAM()

Syntax	No. of bits	Mnemonic
lpd_channel_stream(core_mode_last)		
{		
acelp_core_mode	3	uimbsf
lpd_mode	5	uimbsf, Note 1
first_tcx_flag=TRUE;		
k=0;		
if (first_lpd_flag){last_lpd_mode = -1}		
while (k<4){		
if (last_lpd_mode==0 && mod[k]>0)		
(last_lpd_mode>0 && mod [k]==0)){	1510	Note 2
fac_data(0)		
}		
if (mod[k]==0) {		
acelp_coding(acelp_core_mode);		
last_lpd_mode=0;		
k+=1		
}		

FIG 15

FIG 15A|FIG 15B

FIG 15A



30/30

SYNTAX OF FAC_DATA()

Syntax	No. of bits	Mnemonic
<pre> fac_data(useGain) { if (useGain) { fac_gain } ~1610 } for (i=0; i<fac_length/8;i++){ nq[i] FAC[i] } } </pre>	7 1..n 4*nq[i]	uimsbf vclbf, Note 1 uimsbf
Note 1: This value is encoded using a modified unary code, where $q_n=0$ is represented by one "0" bit, and any value q_n greater or equal to 2 is represented by q_n-1 "1" bits followed by one "0" stop bit. Note that $q_n=1$ cannot be signaled, because the codebook Q1 is not defined.		

FIG 16