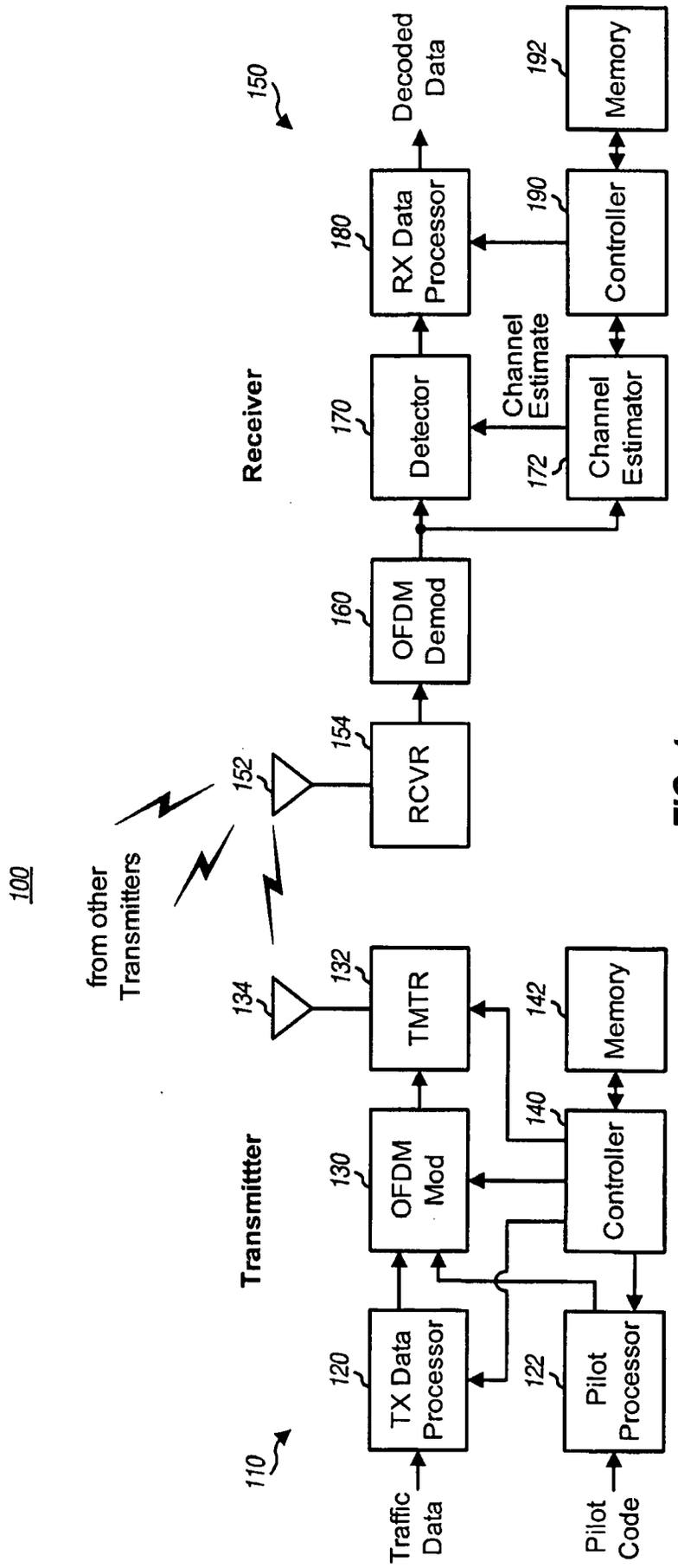

100
110
Transmitter
Receiver
150
Traffic Data
Pilot Code
TX Data Processor
120
Pilot Processor
122
OFDM Mod
130
Controller
140
TMTR
132
Memory
142
134
152
from other Transmitters
154
RCVR
OFDM Demod
160
Detector
170
Channel Estimate
172
Channel Estimator
RX Data Processor
180
Controller
190
Memory
192
Decoded Data

FIG. 1

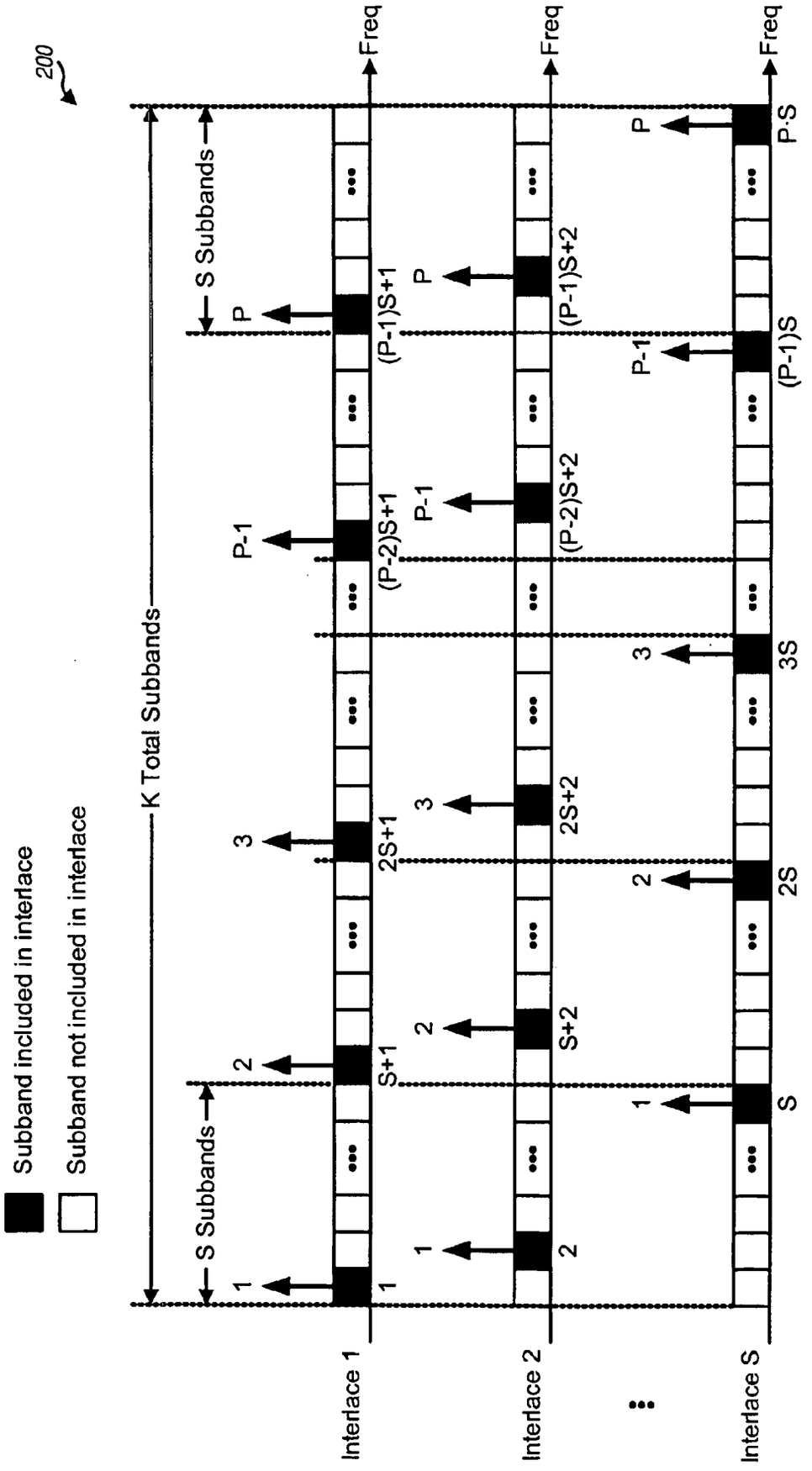

200
Subband included in interlace
Subband not included in interlace
K Total Subbands
S Subbands
S Subbands
Freq
Freq
Freq
Interlace 1
Interlace 2
Interlace S
1
2
3
P-1
P
S+1
2S+1
(P-2)S+1
(P-1)S+1
S
2S
3S
(P-1)S
P·S

FIG. 2

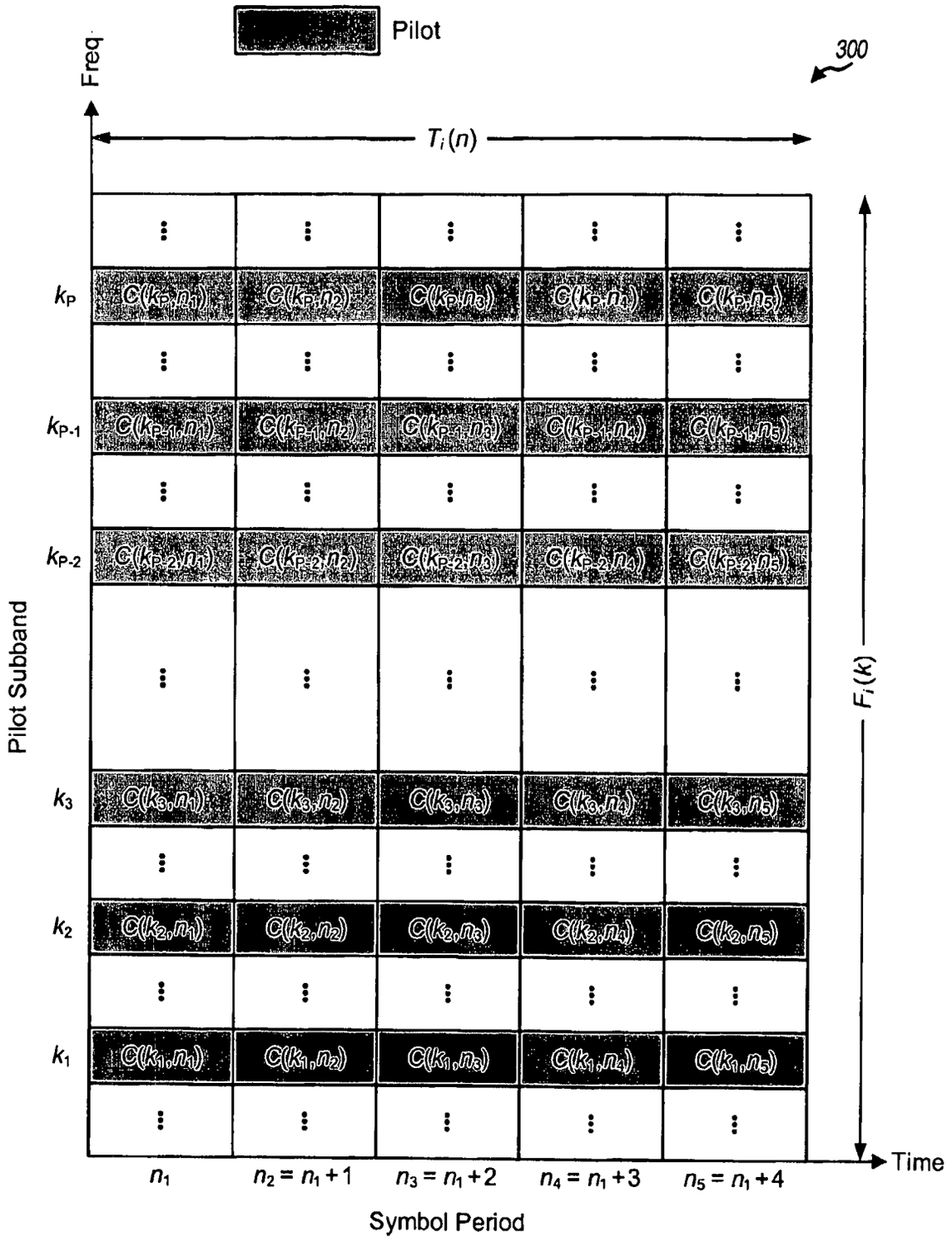

Pilot
300
Freq
$T_i(n)$
$k_P$
$k_{P-1}$
$k_{P-2}$
$k_3$
$k_2$
$k_1$
Pilot Subband
$F_i(k)$
Time
$n_1$
$n_2 = n_1 + 1$
$n_3 = n_1 + 2$
$n_4 = n_1 + 3$
$n_5 = n_1 + 4$
Symbol Period

*FIG. 3*

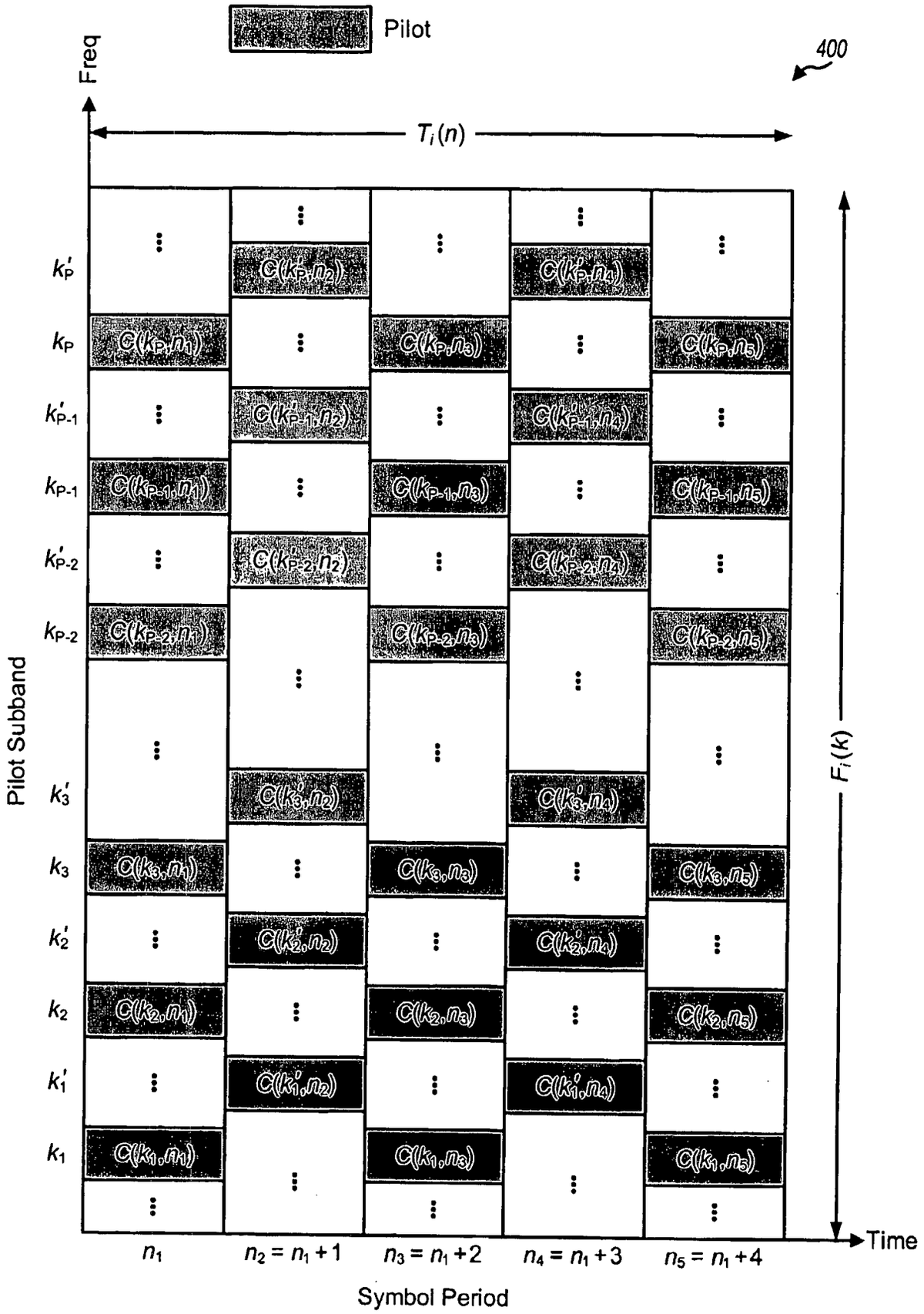

Pilot
400
Freq
$T_i(n)$
$k'_P$
$k_P$
$k'_{P-1}$
$k_{P-1}$
$k'_{P-2}$
$k_{P-2}$
$k'_3$
$k_3$
$k'_2$
$k_2$
$k'_1$
$k_1$
Pilot Subband
$F_i(k)$
Time
$n_1$
$n_2 = n_1 + 1$
$n_3 = n_1 + 2$
$n_4 = n_1 + 3$
$n_5 = n_1 + 4$
Symbol Period

FIG. 4

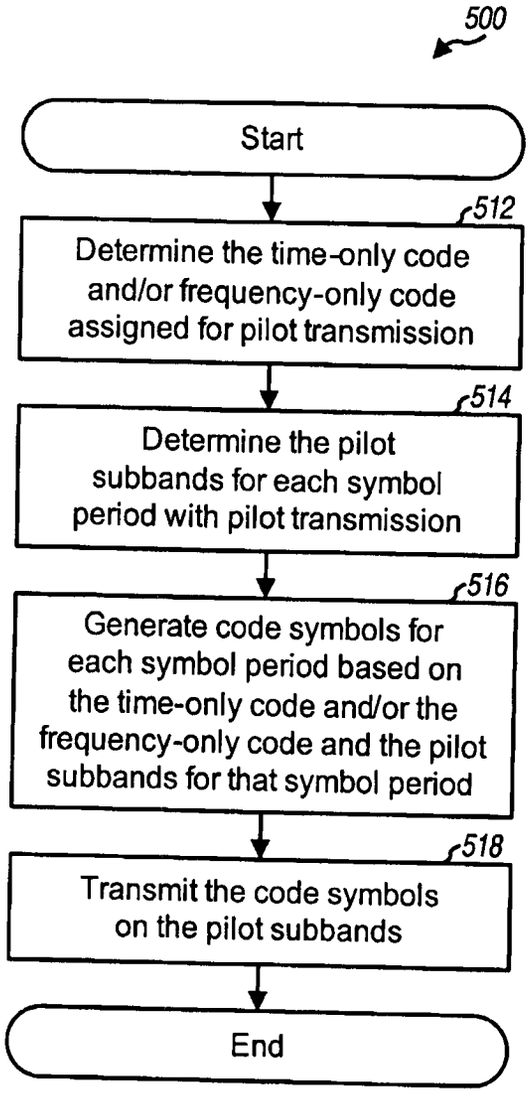

500
Start
512
Determine the time-only code and/or frequency-only code assigned for pilot transmission
514
Determine the pilot subbands for each symbol period with pilot transmission
516
Generate code symbols for each symbol period based on the time-only code and/or the frequency-only code and the pilot subbands for that symbol period
518
Transmit the code symbols on the pilot subbands
End

FIG. 5

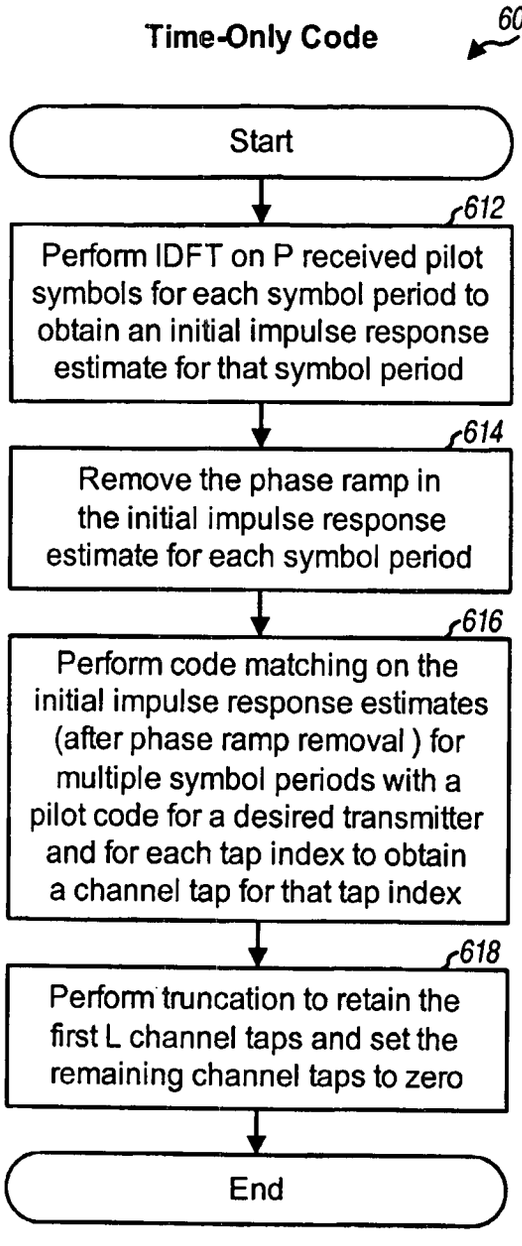

Time-Only Code
600
Start
612
Perform IDFT on P received pilot symbols for each symbol period to obtain an initial impulse response estimate for that symbol period
614
Remove the phase ramp in the initial impulse response estimate for each symbol period
616
Perform code matching on the initial impulse response estimates (after phase ramp removal ) for multiple symbol periods with a pilot code for a desired transmitter and for each tap index to obtain a channel tap for that tap index
618
Perform truncation to retain the first L channel taps and set the remaining channel taps to zero
End

FIG. 6

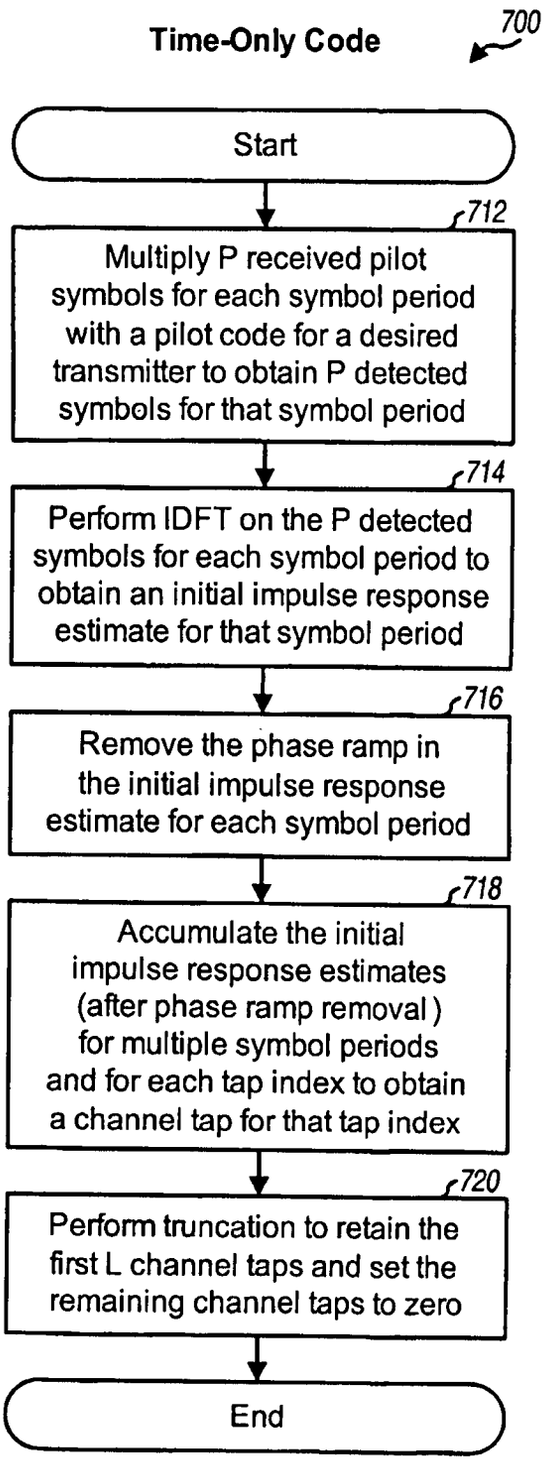

Time-Only Code
700
Start
712
Multiply P received pilot symbols for each symbol period with a pilot code for a desired transmitter to obtain P detected symbols for that symbol period
714
Perform IDFT on the P detected symbols for each symbol period to obtain an initial impulse response estimate for that symbol period
716
Remove the phase ramp in the initial impulse response estimate for each symbol period
718
Accumulate the initial impulse response estimates (after phase ramp removal ) for multiple symbol periods and for each tap index to obtain a channel tap for that tap index
720
Perform truncation to retain the first L channel taps and set the remaining channel taps to zero
End

FIG. 7

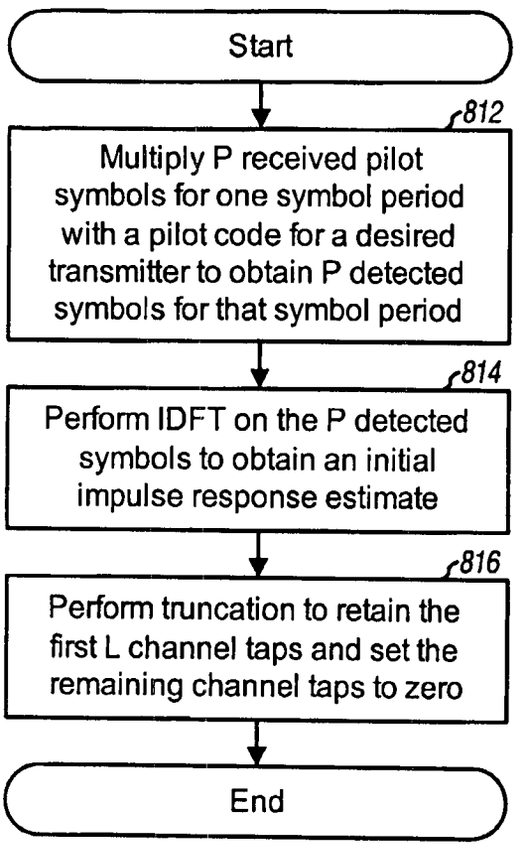

800
Frequency-Only Code
Start
812
Multiply P received pilot symbols for one symbol period with a pilot code for a desired transmitter to obtain P detected symbols for that symbol period
814
Perform IDFT on the P detected symbols to obtain an initial impulse response estimate
816
Perform truncation to retain the first L channel taps and set the remaining channel taps to zero
End

FIG. 8

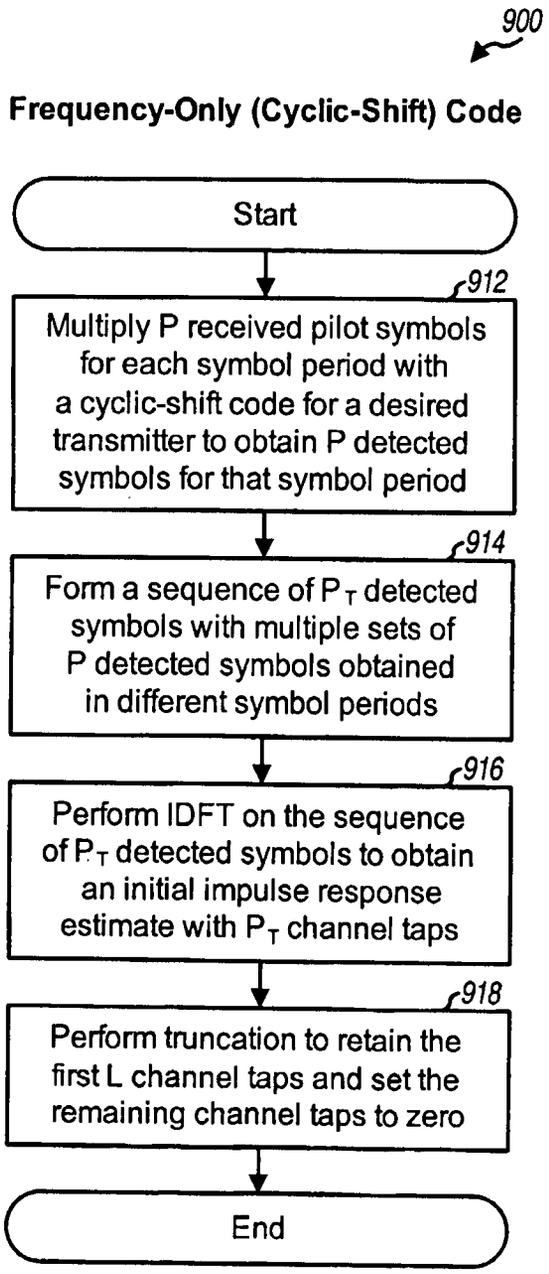

900
Frequency-Only (Cyclic-Shift) Code
Start
912
Multiply P received pilot symbols for each symbol period with a cyclic-shift code for a desired transmitter to obtain P detected symbols for that symbol period
914
Form a sequence of $P_T$ detected symbols with multiple sets of P detected symbols obtained in different symbol periods
916
Perform IDFT on the sequence of $P_T$ detected symbols to obtain an initial impulse response estimate with $P_T$ channel taps
918
Perform truncation to retain the first L channel taps and set the remaining channel taps to zero
End

FIG. 9

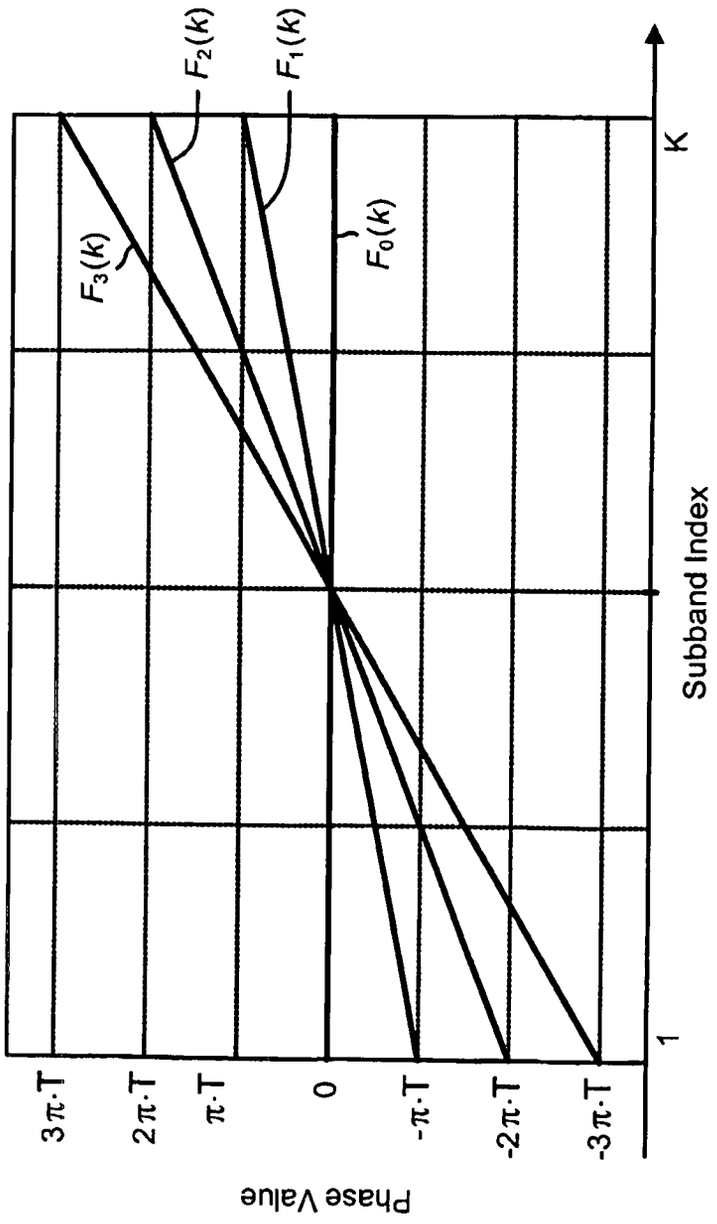

$F_2(k)$
$F_1(k)$
$F_3(k)$
$F_0(k)$
K
1
Subband Index
3π·T
2π·T
π·T
0
-π·T
-2π·T
-3π·T
Phase Value

FIG. 10

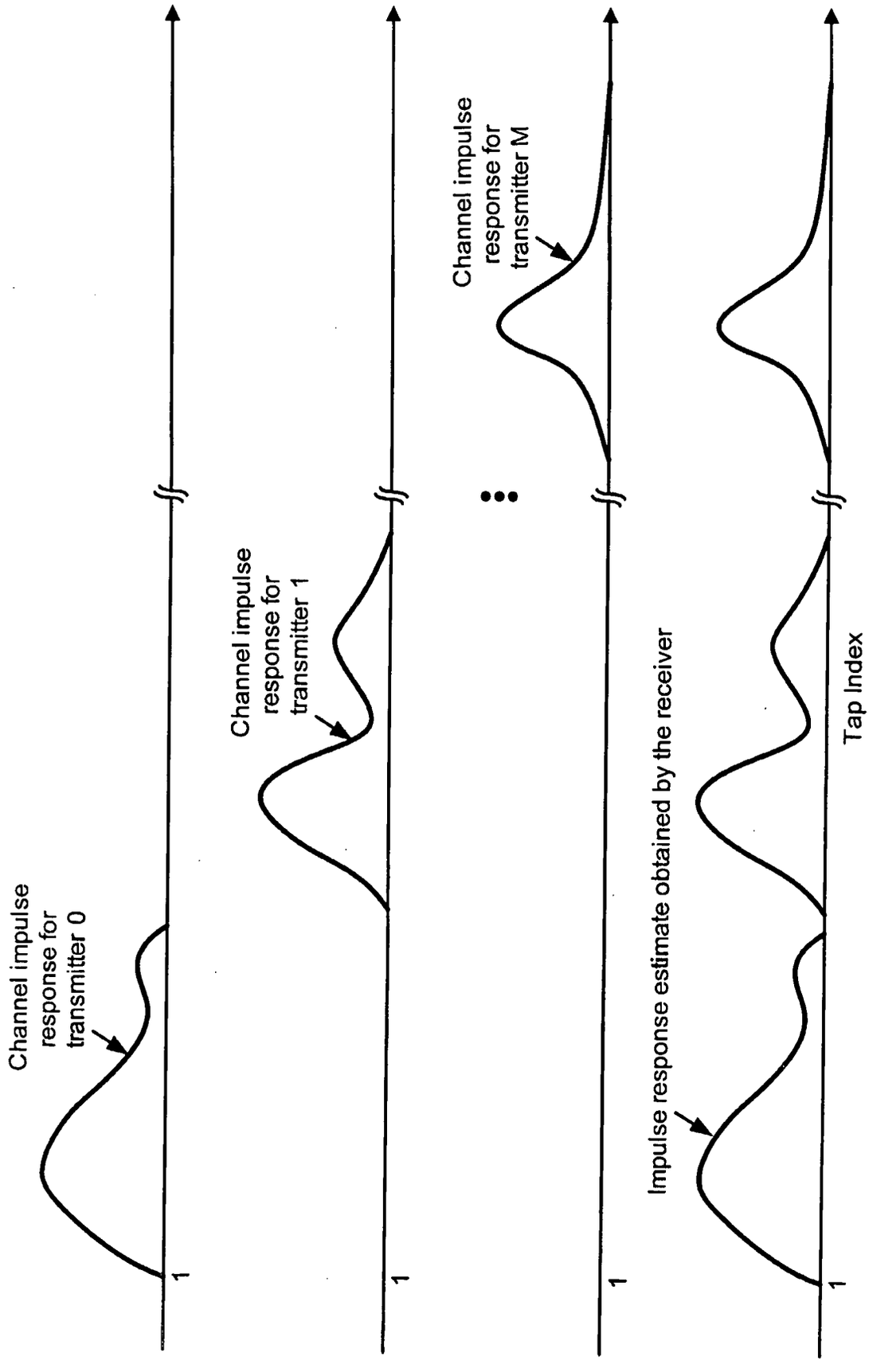

Channel impulse response for transmitter 0
Channel impulse response for transmitter 1
Channel impulse response for transmitter M
Impulse response estimate obtained by the receiver
1
Tap Index

FIG. 11

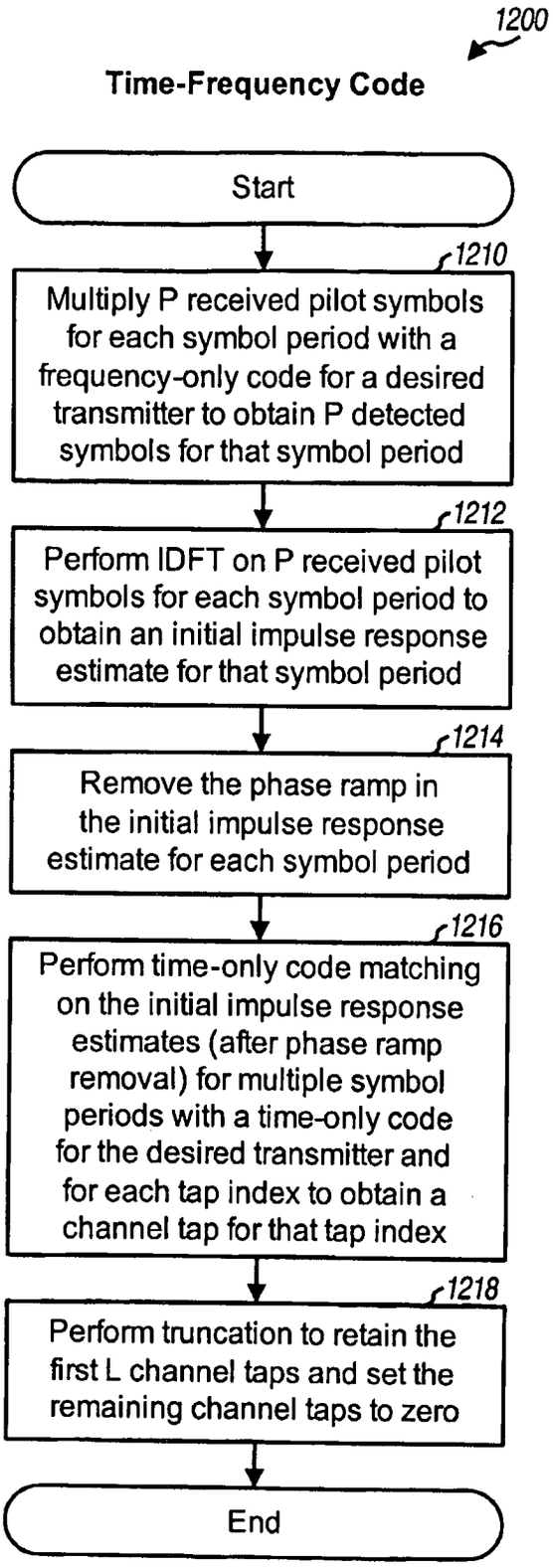

1200
Time-Frequency Code
Start
1210
Multiply P received pilot symbols for each symbol period with a frequency-only code for a desired transmitter to obtain P detected symbols for that symbol period
1212
Perform IDFT on P received pilot symbols for each symbol period to obtain an initial impulse response estimate for that symbol period
1214
Remove the phase ramp in the initial impulse response estimate for each symbol period
1216
Perform time-only code matching on the initial impulse response estimates (after phase ramp removal) for multiple symbol periods with a time-only code for the desired transmitter and for each tap index to obtain a channel tap for that tap index
1218
Perform truncation to retain the first L channel taps and set the remaining channel taps to zero
End

*FIG. 12*