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Chen et al.

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(54) **BASEBAND PROCESSORS, MOBILE TERMINALS, BASE STATIONS AND METHODS AND SYSTEMS FOR DECODING A PUNCTURED CODED RECEIVED SIGNAL USING ESTIMATES OF PUNCTURED BITS**

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(52) **U.S. Cl.** **375/340**; 714/790
(58) **Field of Search** 375/340, 341, 375/316; 714/794, 786, 790, 795, 799

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(57) **ABSTRACT**

Methods, systems, baseband processors, mobile terminals and base stations are provided for decoding a punctured coded signal are provided. The signal is received to provide received symbols. Symbol positions associated with punctured locations are initialized to default symbol values. The received symbols and the default symbol values are error correction decoded to provide first signal estimates. Punctured location symbol estimates are generated based on the first signal estimates and the received symbols are combined with the punctured location symbol estimates placed in corresponding punctured locations. The combined received symbols with the punctured location symbol estimates are error correction decoded to provide second signal estimates.
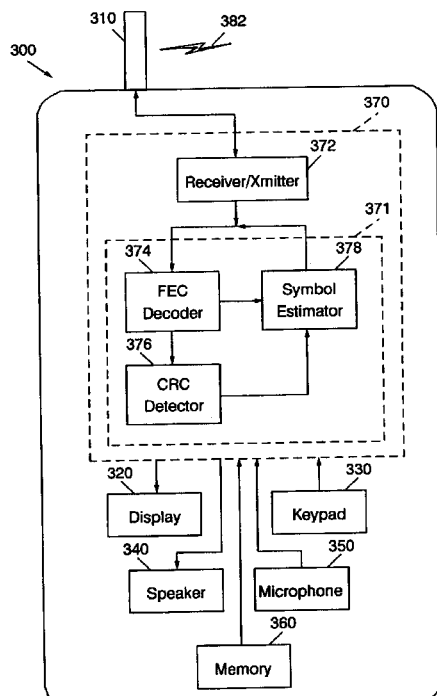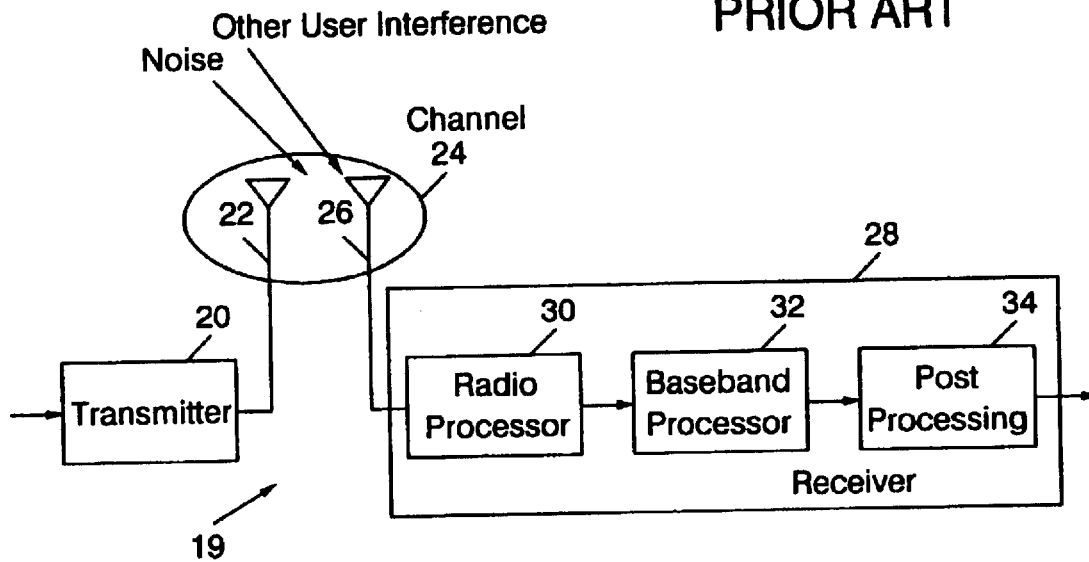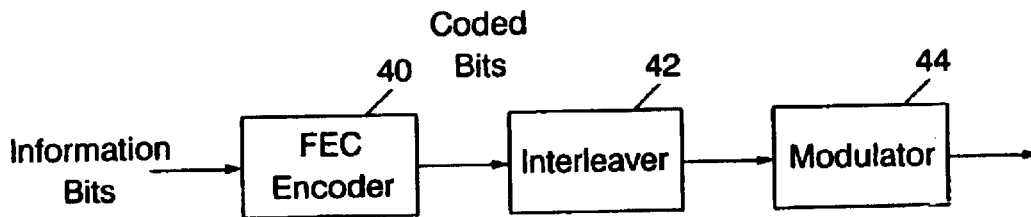
28 Claims, 6 Drawing Sheets

FIG. 1
PRIOR ART

Other User Interference

Noise

Channel
24

22 26

20

Transmitter

19

28

30   32   34

Radio
Processor

Baseband
Processor

Post
Processing

Receiver

FIG. 2
PRIOR ART

Coded
Bits

40   42   44

Information
Bits

FEC
Encoder

Interleaver

Modulator

FIG. 3
PRIOR ART

200

b_1
b_2
. . .
b_N

source
data bits

encoding

210

$(c_{11}\ c_{12}\ c_{13})$
$(c_{21}\ c_{22}\ c_{23})$
. . .
$(c_{N1}\ c_{N2}\ c_{N3})$

non-punctured
codeword, rate 1/3

puncturing

215

$c_{11}\ c_{12}$
$c_{21}\ c_{22}$
. . .
$c_{N1}\ c_{N2}$

punctured
codeword, rate 1/2

interleaving
& modulation

Channel

FIG. 4

310

382

300

370

Receiver/Xmitter 372

371

374 **FEC Decoder**

378 **Symbol Estimator**

376 **CRC Detector**

320 **Display**

330 **Keypad**

340 **Speaker**

350 **Microphone**

360 **Memory**

FIG. 5

DOCKET ALARM
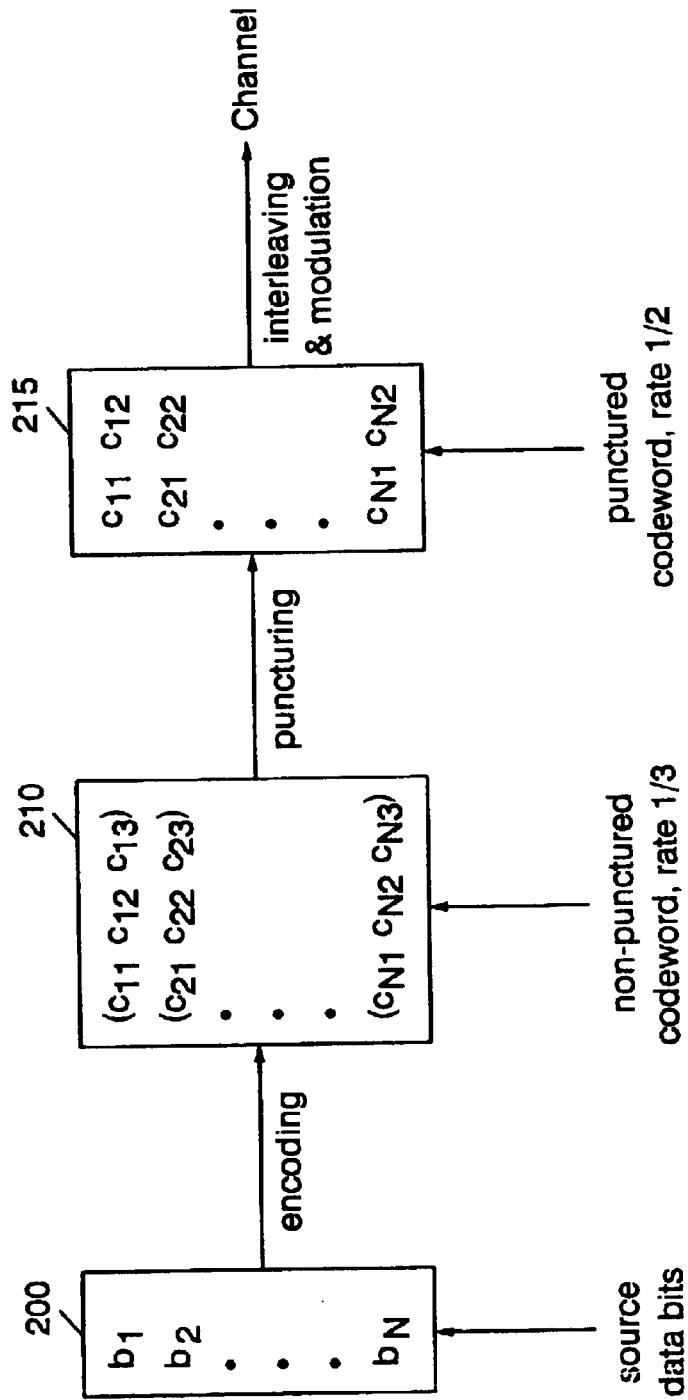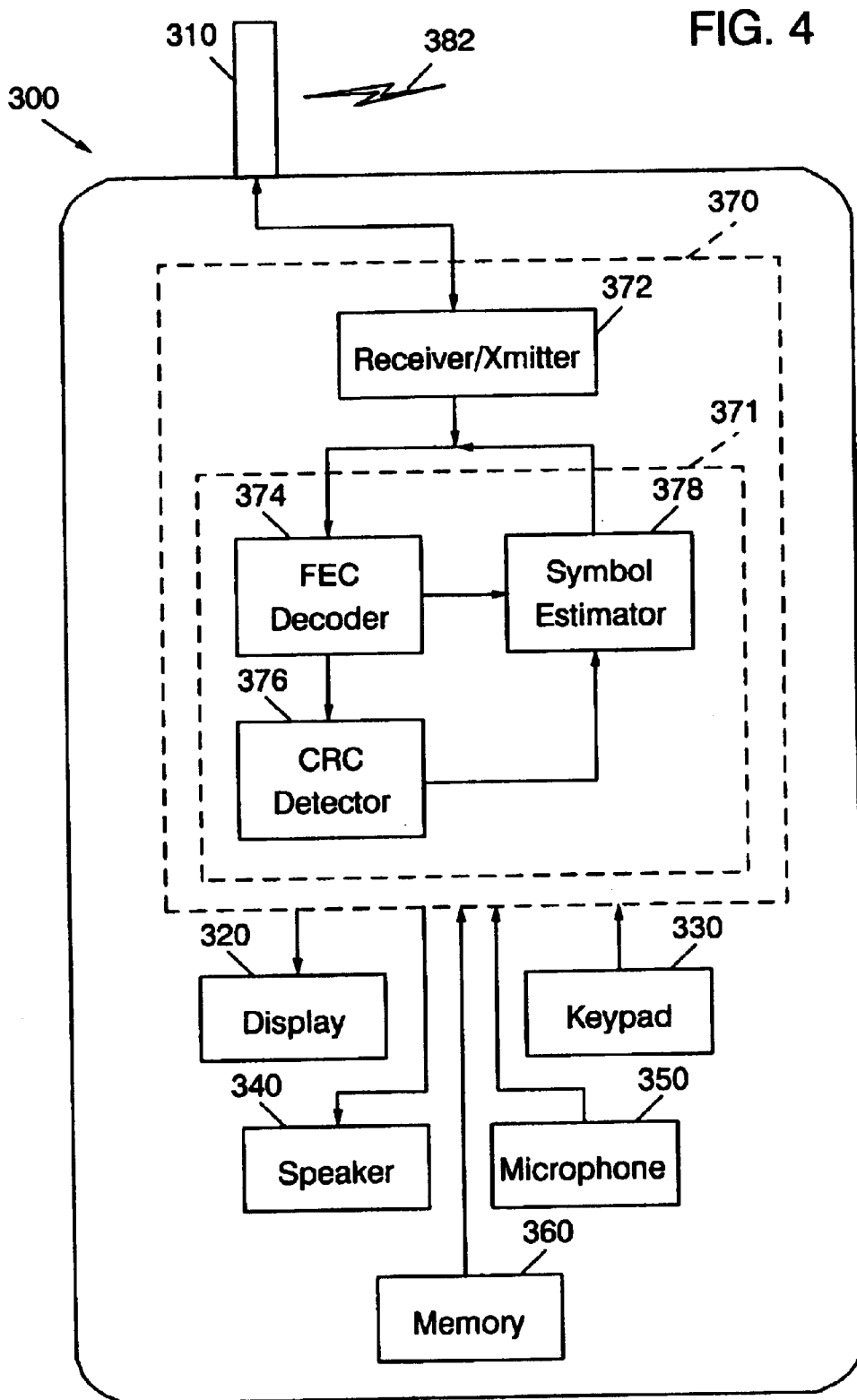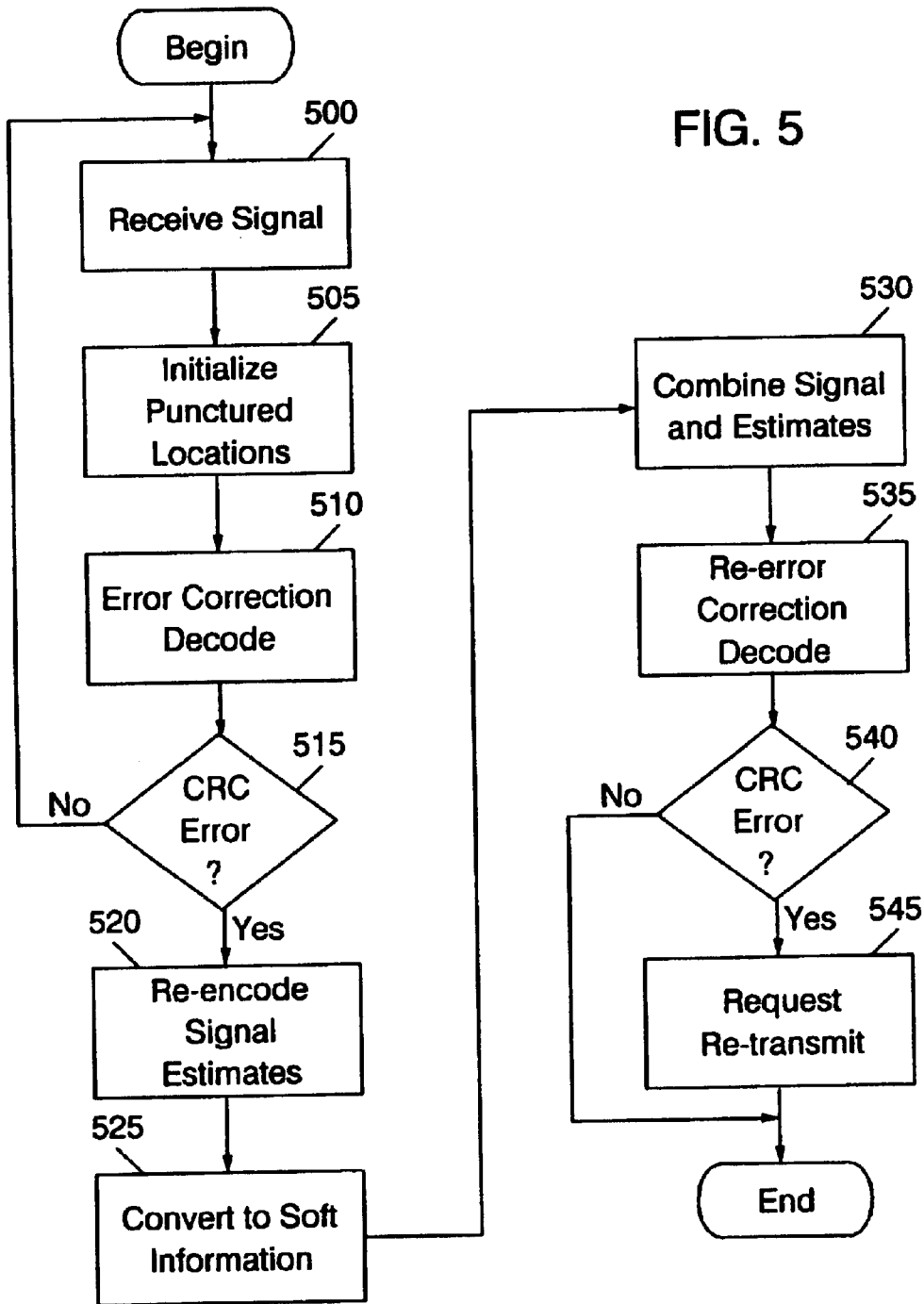
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