FIG. 1

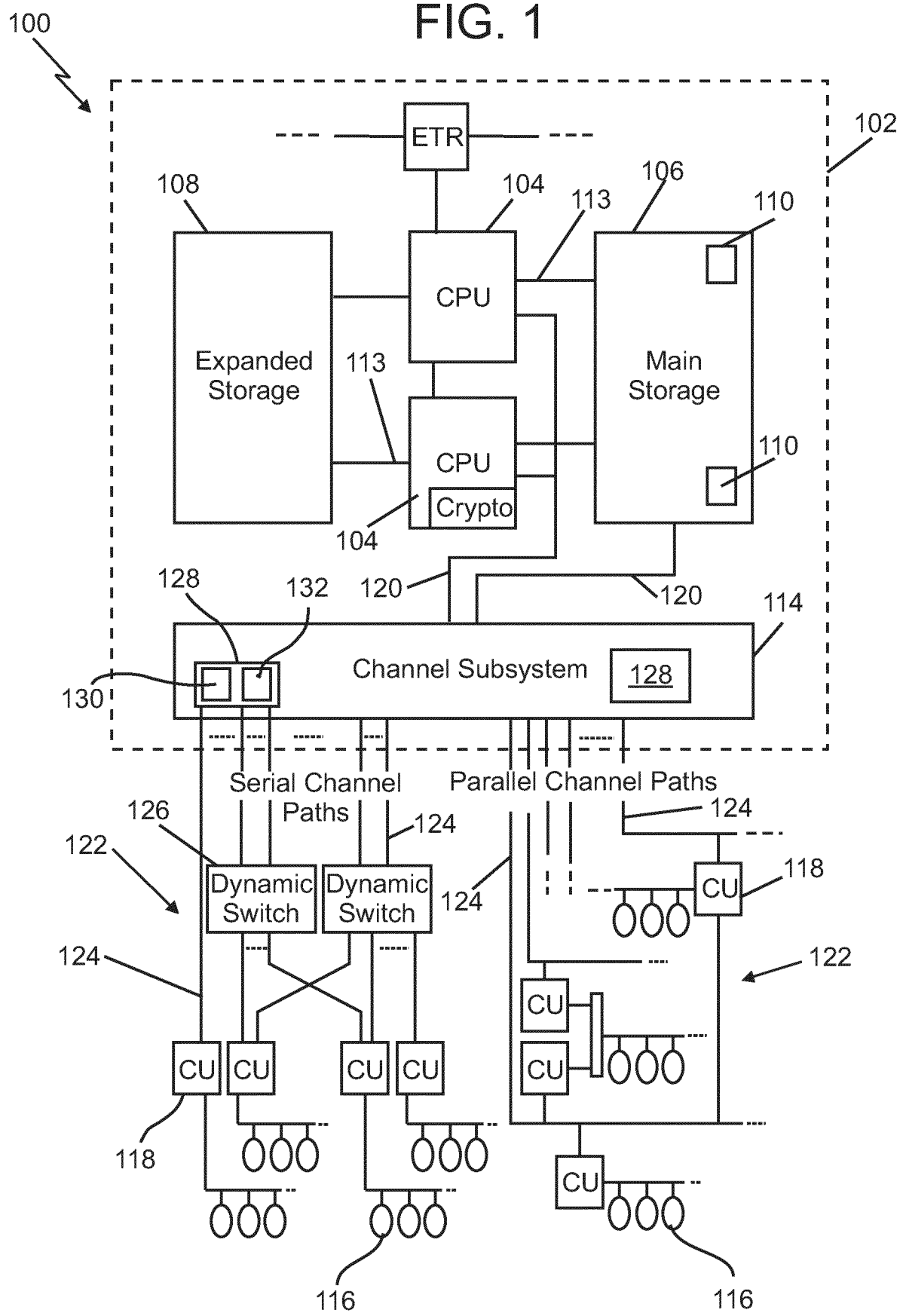

100
102
ETR
108
104
113
106
110
CPU
Expanded Storage
113
Main Storage
CPU
Crypto
110
104
128
132
120
120
114
Channel Subsystem
128
130
Serial Channel Paths
Parallel Channel Paths
126
124
124
122
Dynamic Switch
Dynamic Switch
124
CU
118
122
124
CU
CU
CU
CU
CU
CU
118
CU
116
116

FIG. 2

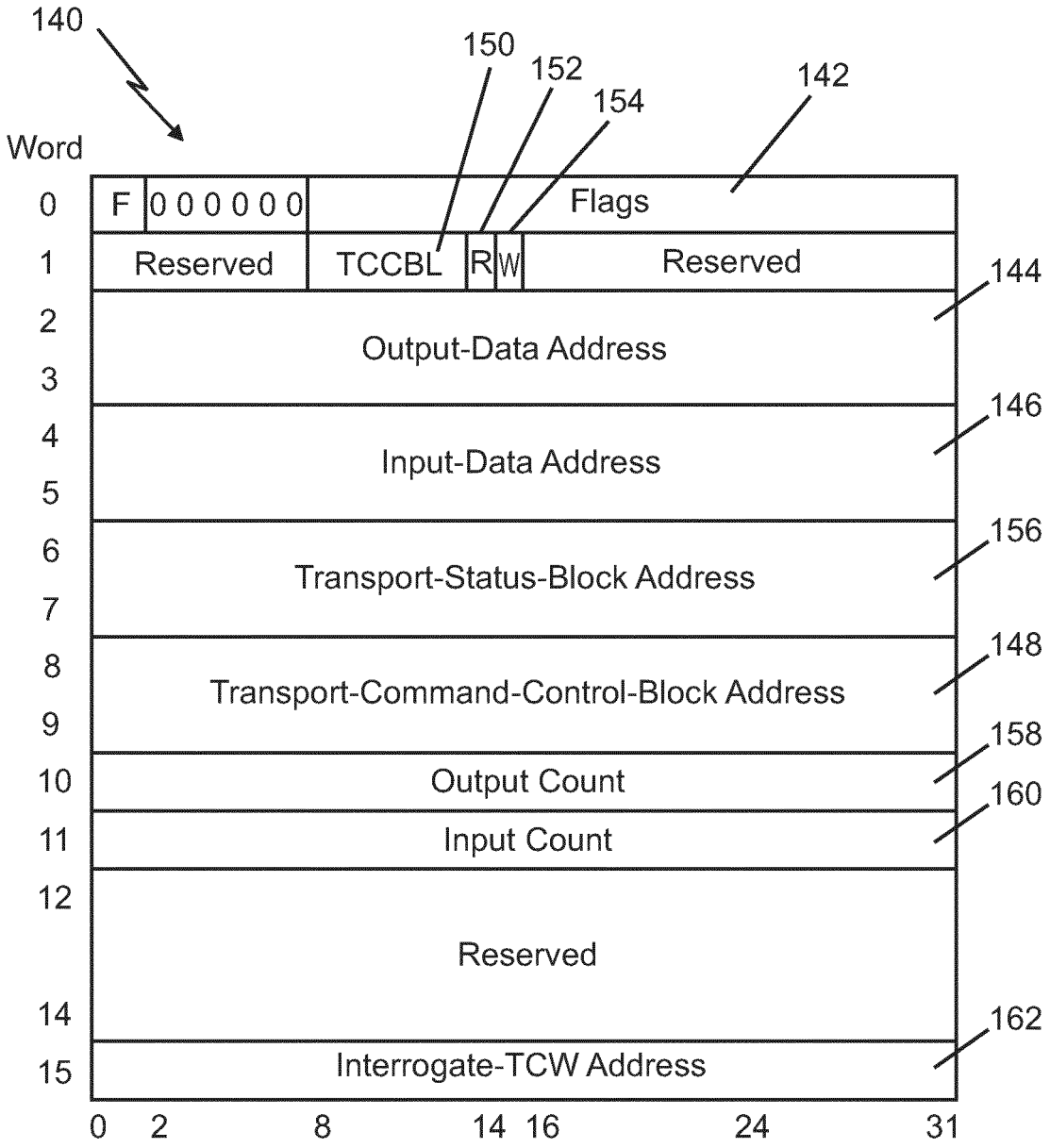

140
150
152
154
142
Word
0
1
2
3
4
5
6
7
8
9
10
11
12
14
15
F
0 0 0 0 0 0
Flags
Reserved
TCCBL
R
W
Reserved
Output-Data Address
Input-Data Address
Transport-Status-Block Address
Transport-Command-Control-Block Address
Output Count
Input Count
Reserved
Interrogate-TCW Address
144
146
156
148
158
160
162
0
2
8
14
16
24
31

FIG. 3

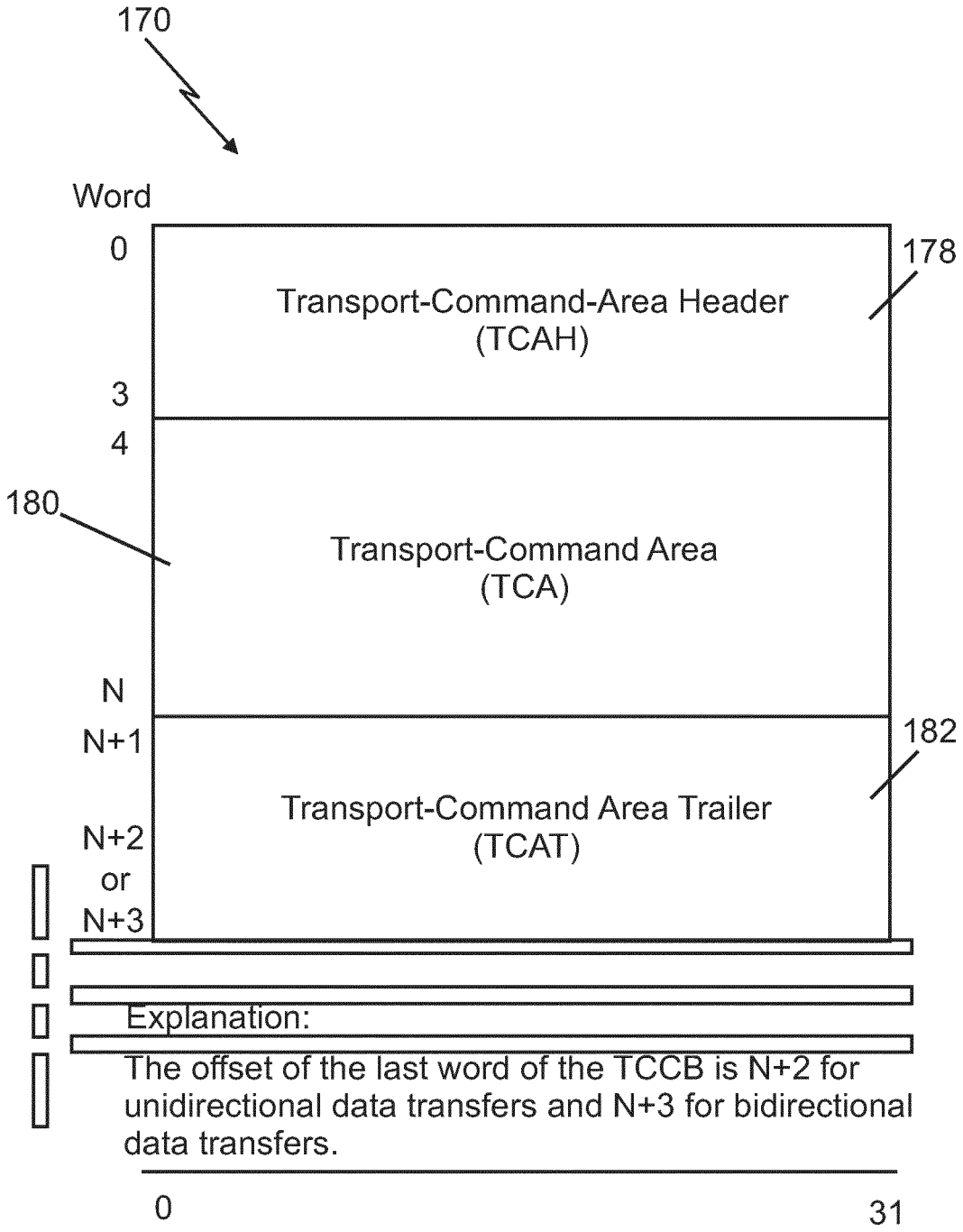

170
Word
0
3
4
N
N+1
N+2
or
N+3
178
182
180
Transport-Command-Area Header
(TCAH)
Transport-Command Area
(TCA)
Transport-Command Area Trailer
(TCAT)
Explanation:
The offset of the last word of the TCCB is N+2 for unidirectional data transfers and N+3 for bidirectional data transfers.
0
31

FIG. 4

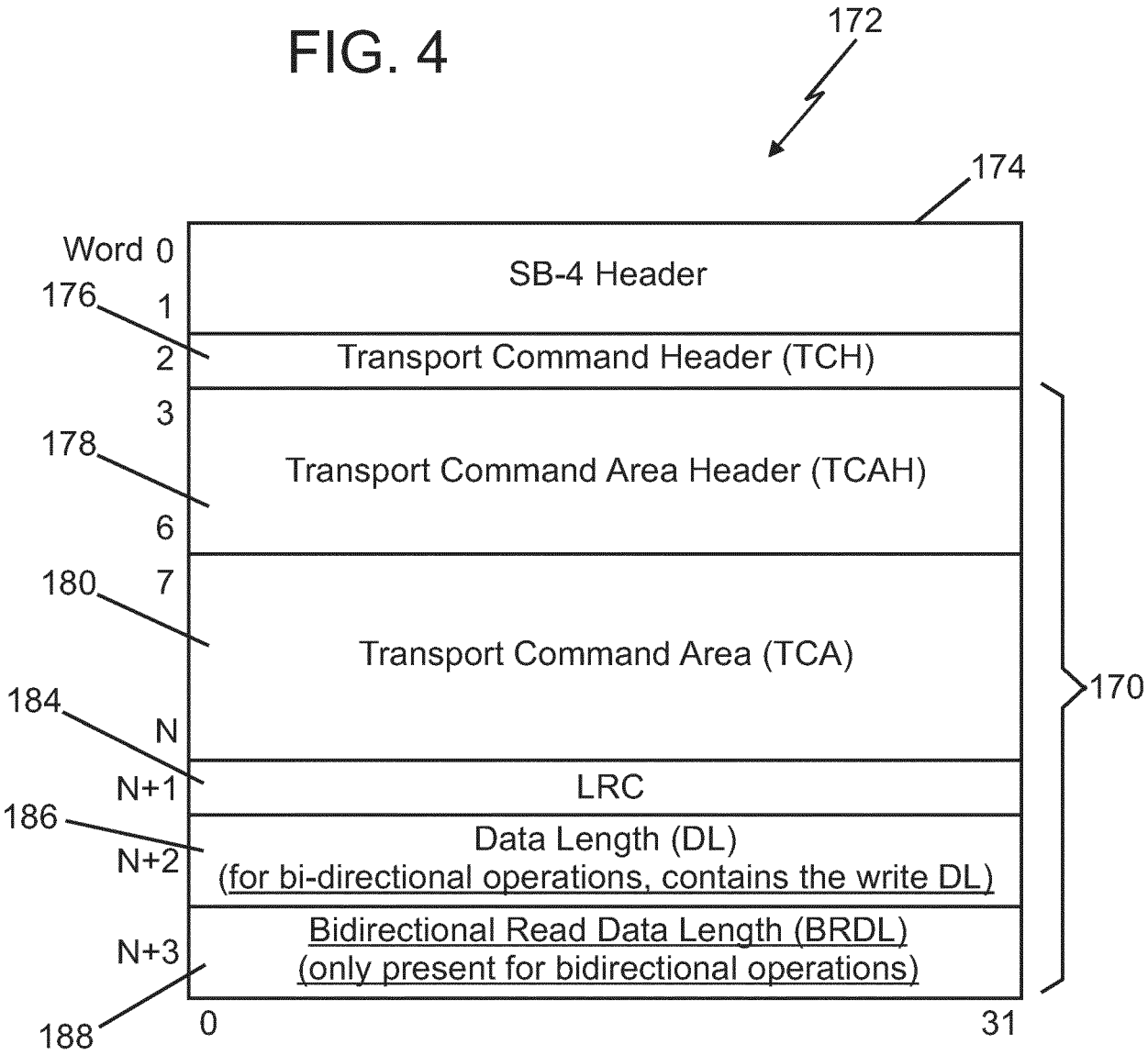

172
174
Word 0
1
2
3
6
7
N
N+1
N+2
N+3
176
178
180
184
186
188
SB-4 Header
Transport Command Header (TCH)
Transport Command Area Header (TCAH)
Transport Command Area (TCA)
LRC
Data Length (DL)
(for bi-directional operations, contains the write DL)
Bidirectional Read Data Length (BRDL)
(only present for bidirectional operations)
170
0
31

FIG. 5

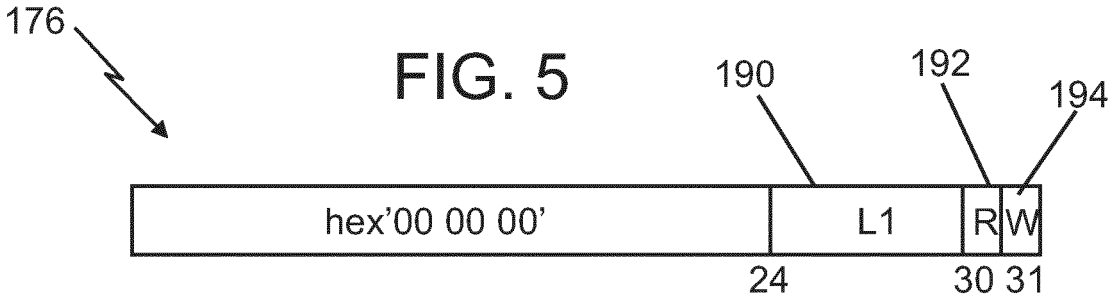

176
190
192
194
hex'00 00 00'
L1
R
W
24
30
31

FIG. 6

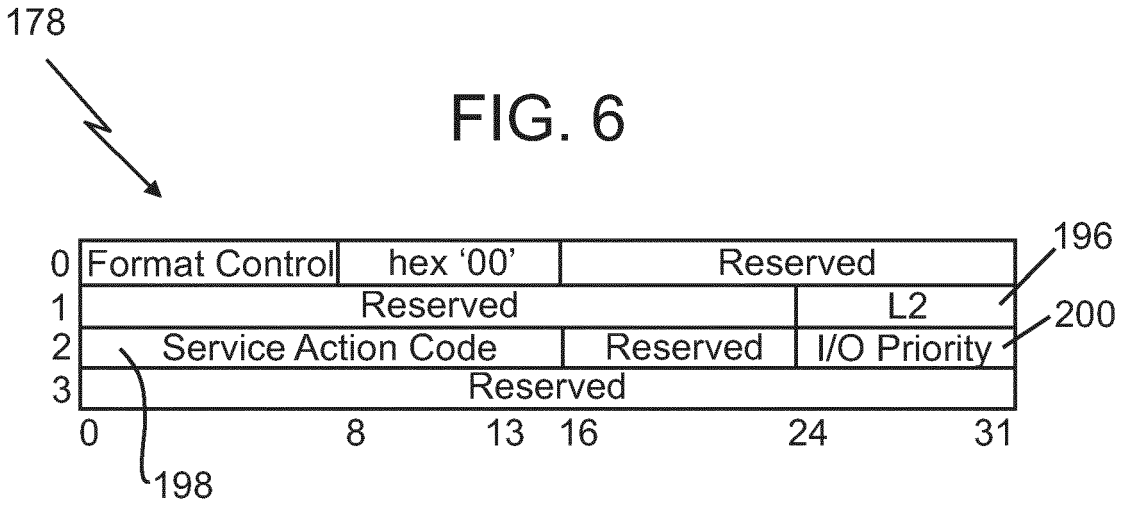

178
196
200
0
1
2
3
Format Control
hex '00'
Reserved
Reserved
L2
Service Action Code
Reserved
I/O Priority
Reserved
0
8
13
16
24
31
198

FIG. 7

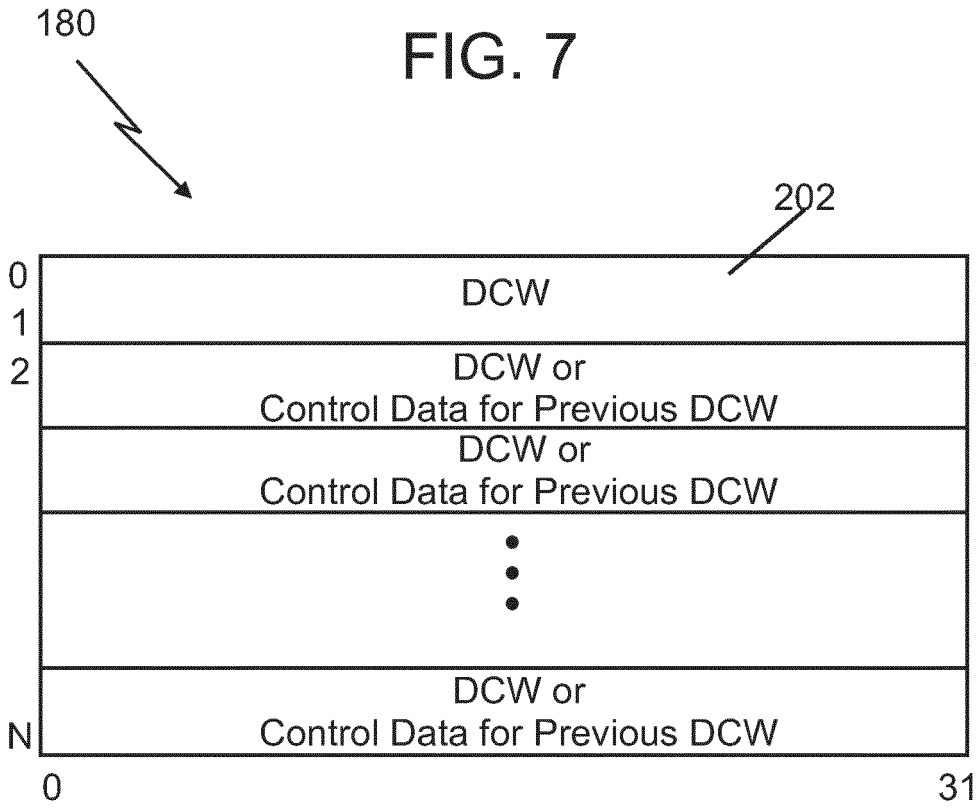

180
202
0
1
2
N
DCW
DCW or
Control Data for Previous DCW
DCW or
Control Data for Previous DCW
DCW or
Control Data for Previous DCW
0
31

FIG. 8

Operation	TCW Input Count	TCW Output Count	TCAT Transport Count
Input operation (TCW R-bit is 1)	Sum of DCW count values in the TCA.	n/a	Sum of DCW count values in TCA, rounded to four,[2] plus four[2]
Output operation(TCW W-bit is 1), TIDAWS not used (TCW output-TIDA flag is 0)	n/a	Sum of DCW count values in TCA.	Sum of DCW count values in TCA, rounded to four,[2] plus four[2]
Output operation (TCW W-bit is 1), TIDAWS used (TCW output-TIDA flag is 1)	n/a	Sum of DCW count values in TCA [AR ONLY: and TCAX] plus the size of the reserved areas in any specified TCMIs[3], plus total of TIDAW-specified CBC and padding bytes[1]	Sum of DCW count values in TCA [AR ONLY: and TCAX], plus the size of the reserved areas in any specified TCMIs[3], plus total of TIDAW-specified CBC and padding bytes,[1] rounded to four,[2] plus four[2]

Explanation:

1 See the description at the insert-CBC control in “Flags” on page 15-1 14.

2 The channel subsystem adds a CBC word to the end of the last data transported. Up to 3 padding bytes are added after the last data transported to ensure the added CBC word is on a word boundary.

3 Because of alignment requirements, the size of the reserved area in a TCMI is either 0 or 4.

FIG. 9

Operation	TCW Input Count	TCW Output Count	TCAT Read Count	TCAT Write Count
Input operation (TCW R-bit is 1) and output operation (TCW W-bit is 1), TIDAWS not used (TCW output-TIDA flag is 0)	Sum of read DCW count values in the TCA and TCAX.	Sum of write DCW count values in the TCA, plus count values in DCWs that specify the transfer of TCMI	Sum of read DCW count values in the TCA and TCAX, rounded to four,[2] plus four[2]	Sum of write DCW count values in the TCA, plus count values in DCWs that specify the transfer of TCMI rounded to four,[2] plus four[2]
Input operation (TCW R-bit is 1) and output operation (TCW W-bit is 1), TIDAWS used (TCW output-TIDA flag is 1)	Sum of read DCW count values in the TCA and TCAX.	Sum of write DCW count values in the TCA and TCAX, plus count values in DCWs that specify the transfer of TCMI, plus the size of the reserved areas in any specified TCMIs [3], plus total of TIDAW-specified CBC and padding bytes.[1]	Sum of read DCW count values in the TCA and TCAX, rounded to four,[2] plus four[2]	Sum of write DCW count values in the TCA and TCAX, plus count values in DCWs that specify the transfer of TCMI, plus the size of the reserved areas in any specified TCMIs [3], plus total of TIDAW-specified CBC and padding bytes,[1] rounded to four,[2] plus four[2]

Explanation:

1 See the description of the insert-CBC control in “Flags” on page 15-1 14.

2 The channel subsystem adds a CBC word to the end of the last data transported. Up to 3 padding bytes are added after the last data transported to ensure the added CBC word is on a word boundary.

3 Because of alignment requirements, the size of the reserved area in a TCMI is either 0 or 4.

FIG. 10

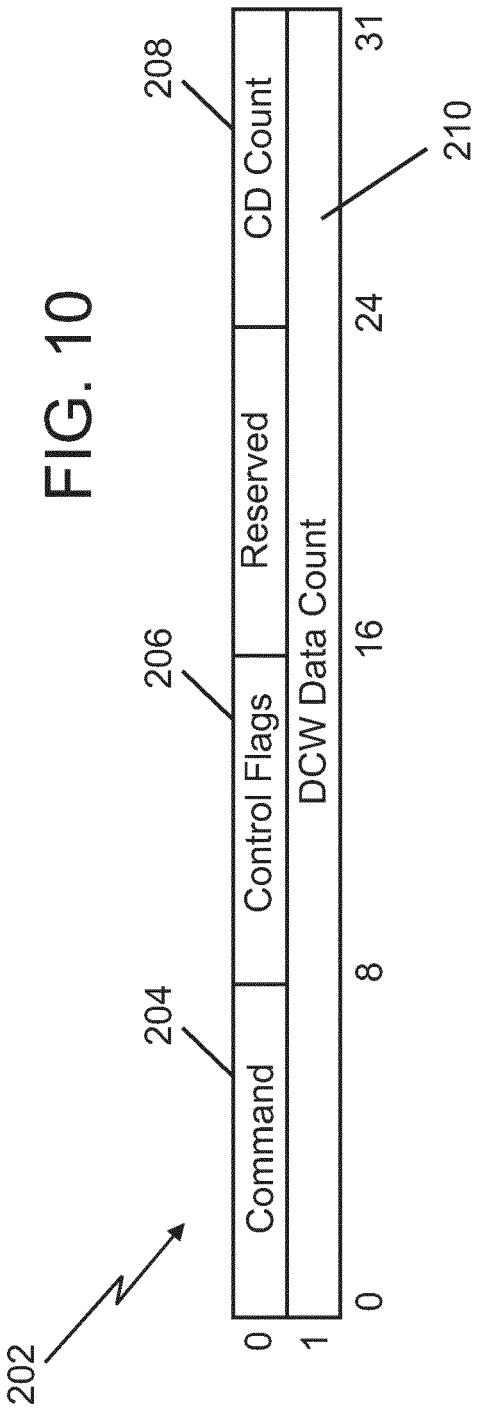

202
204
206
208
210
Command
Control Flags
Reserved
CD Count
DCW Data Count
0
1
8
16
24
31

FIG. 11

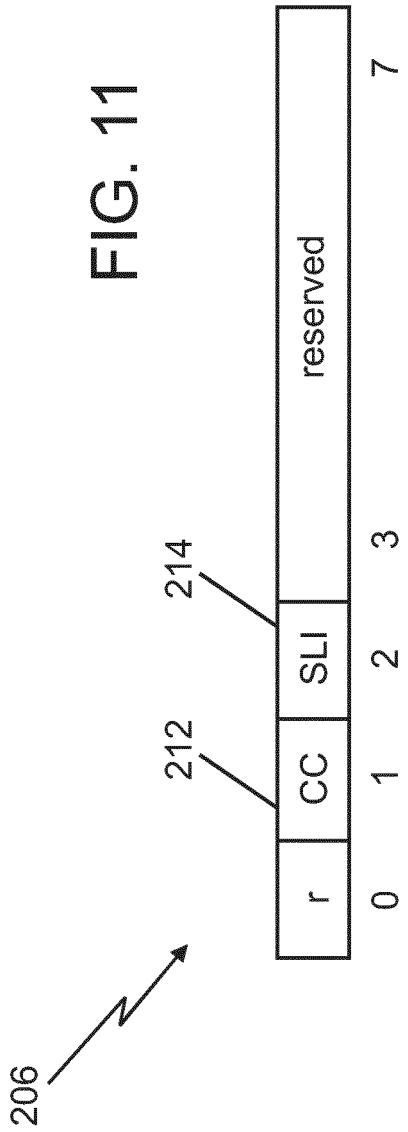

206
212
214
r
CC
SLI
reserved
0
1
2
3
7

FIG. 12

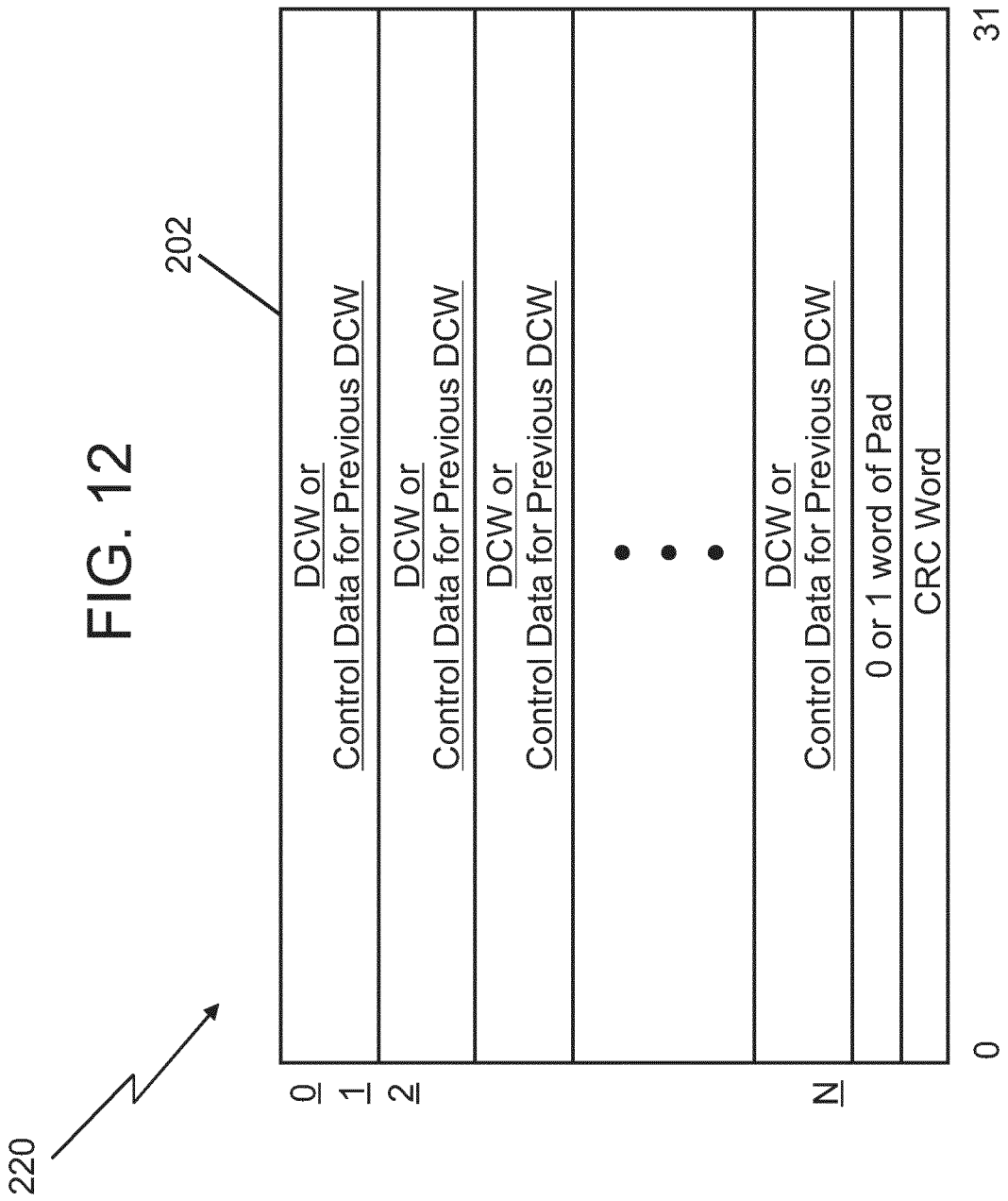
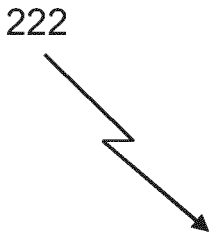
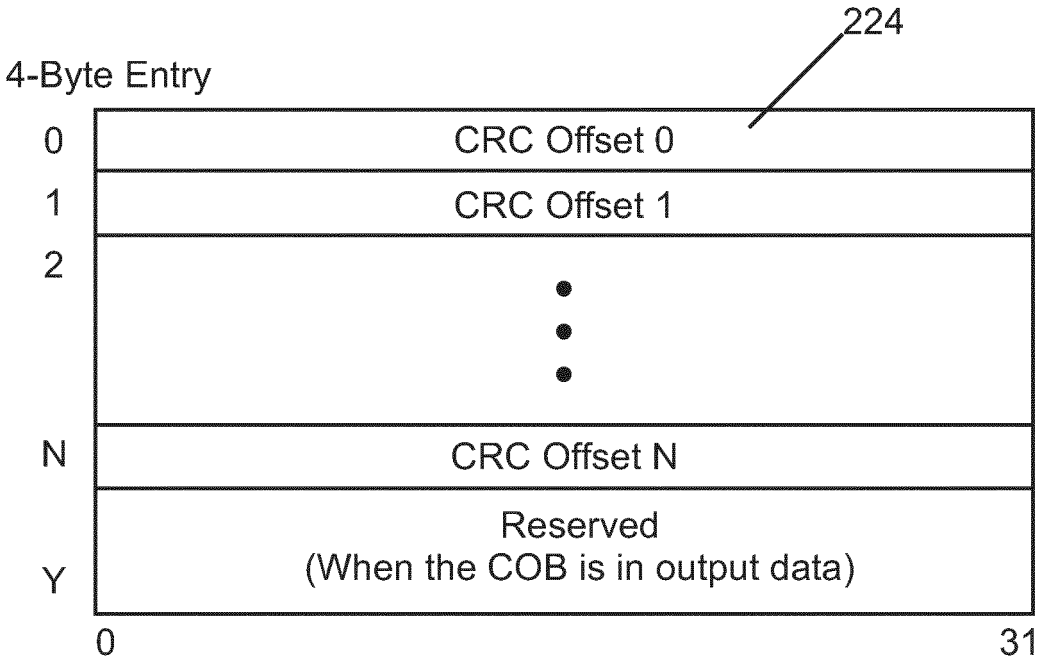

220
202
0
1
2
N
DCW or
Control Data for Previous DCW
DCW or
Control Data for Previous DCW
DCW or
Control Data for Previous DCW
DCW or
Control Data for Previous DCW
0 or 1 word of Pad
CRC Word
31
0

FIG. 13



The COB has the following format:



Explanation:

- The size of the COB is 4(N+1) when the COB is specified in the TCA. (There is no reserved field for this case.)
- The size of the COB is 4(Y+1) when the COB is specified in the output data, where Y is an even number that is equal to either N or N+1.

FIG. 14

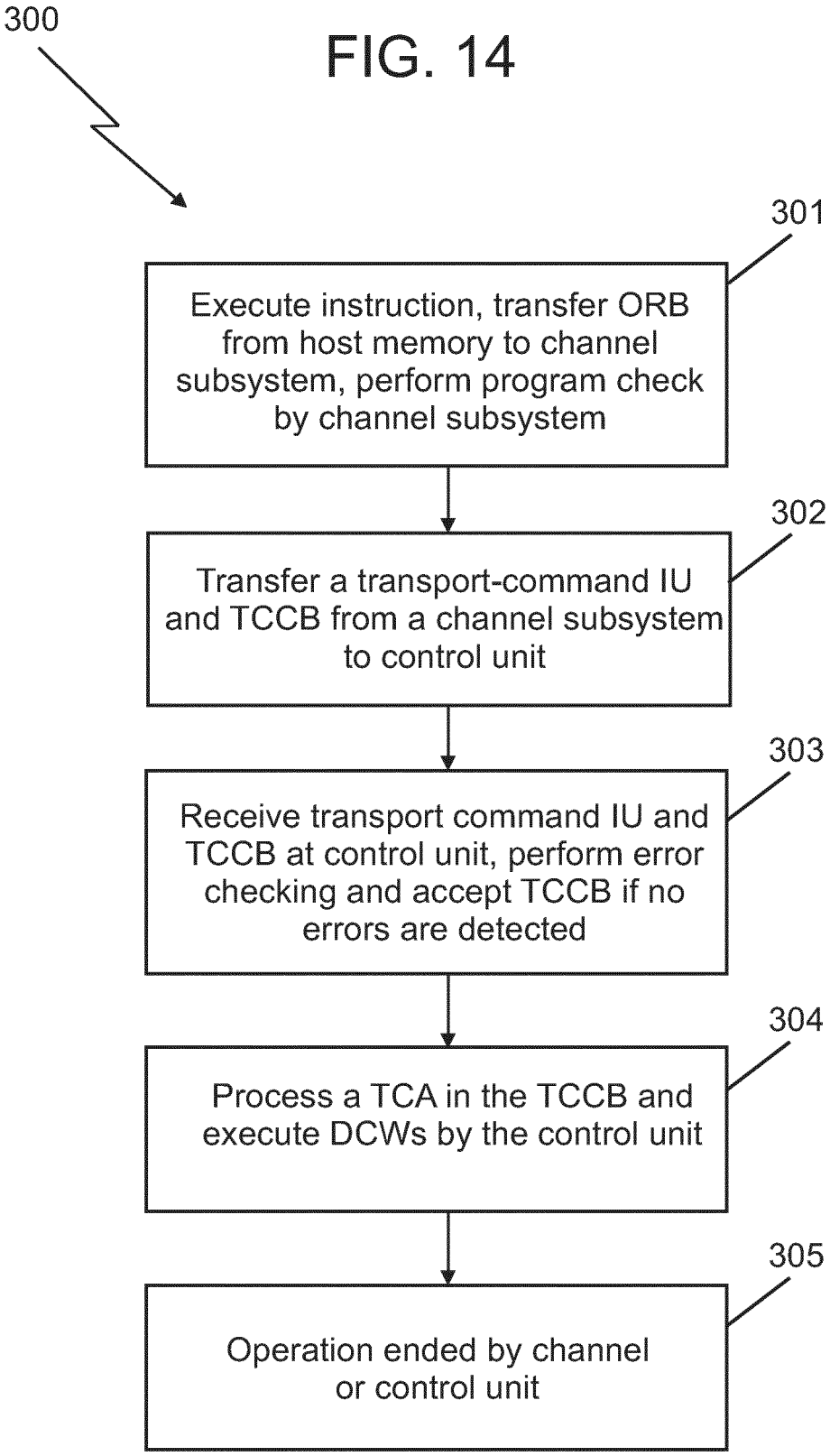

300
301
Execute instruction, transfer ORB from host memory to channel subsystem, perform program check by channel subsystem
302
Transfer a transport-command IU and TCCB from a channel subsystem to control unit
303
Receive transport command IU and TCCB at control unit, perform error checking and accept TCCB if no errors are detected
304
Process a TCA in the TCCB and execute DCWs by the control unit
305
Operation ended by channel or control unit

FIG. 15

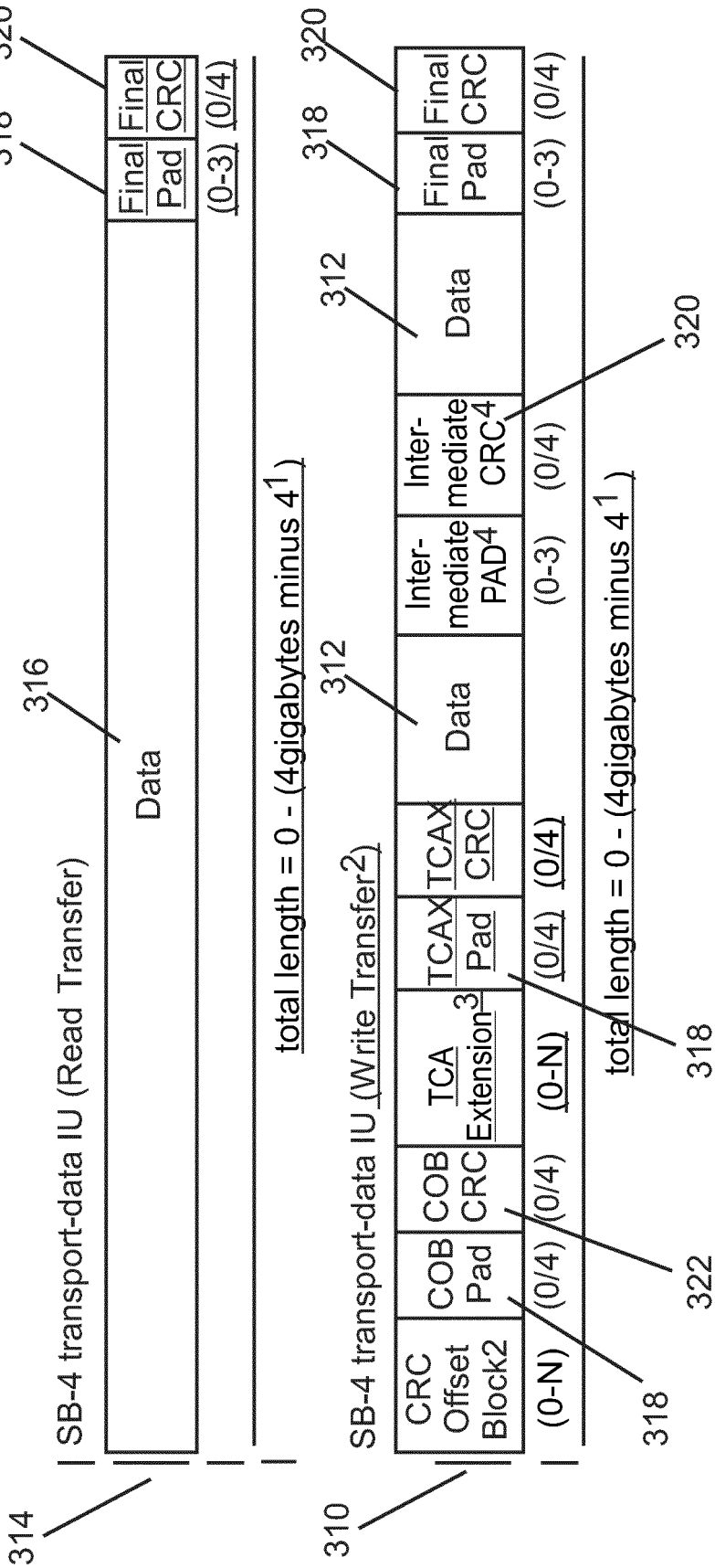

SB-4 transport-data IU (Read Transfer)
314
316
Data
318
Final Pad
320
Final CRC
(0-3)
(0/4)
total length = 0 - (4gigabytes minus 4^1)
SB-4 transport-data IU (Write Transfer^2)
310
CRC Offset Block2
(0-N)
COB Pad
(0/4)
COB CRC
(0/4)
TCA Extension^3
(0-N)
TCAX Pad
(0/4)
TCAX CRC
(0/4)
312
Data
Inter-mediate PAD^4
(0-3)
Inter-mediate CRC^4
(0/4)
Data
312
Final Pad
(0-3)
Final CRC
(0/4)
318
320
322
total length = 0 - (4gigabytes minus 4^1)

FIG. 16

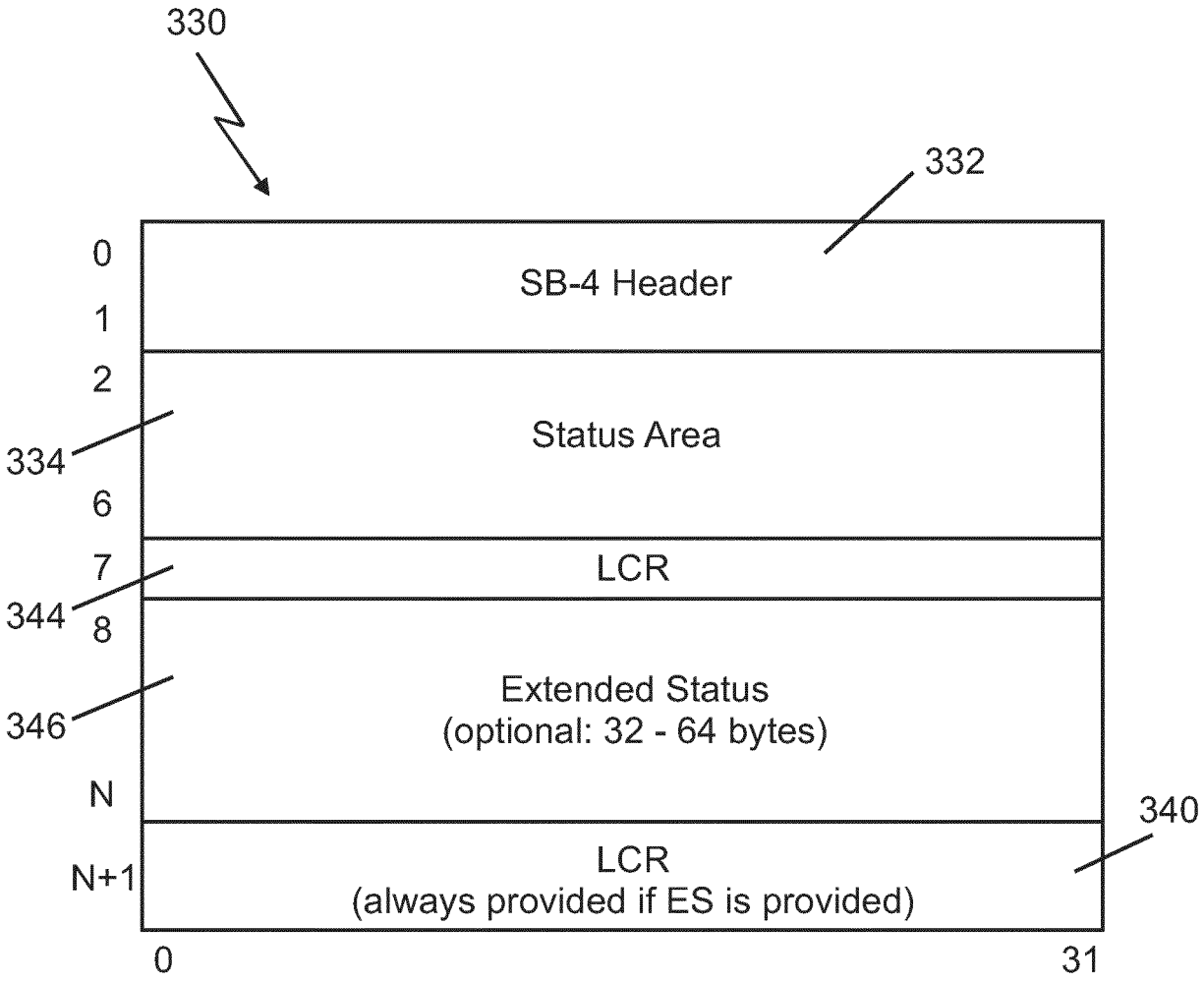

330
332
0
1
SB-4 Header
2
Status Area
334
6
7
LCR
344
8
Extended Status
(optional: 32 - 64 bytes)
346
N
340
N+1
LCR
(always provided if ES is provided)
0
31

FIG. 17

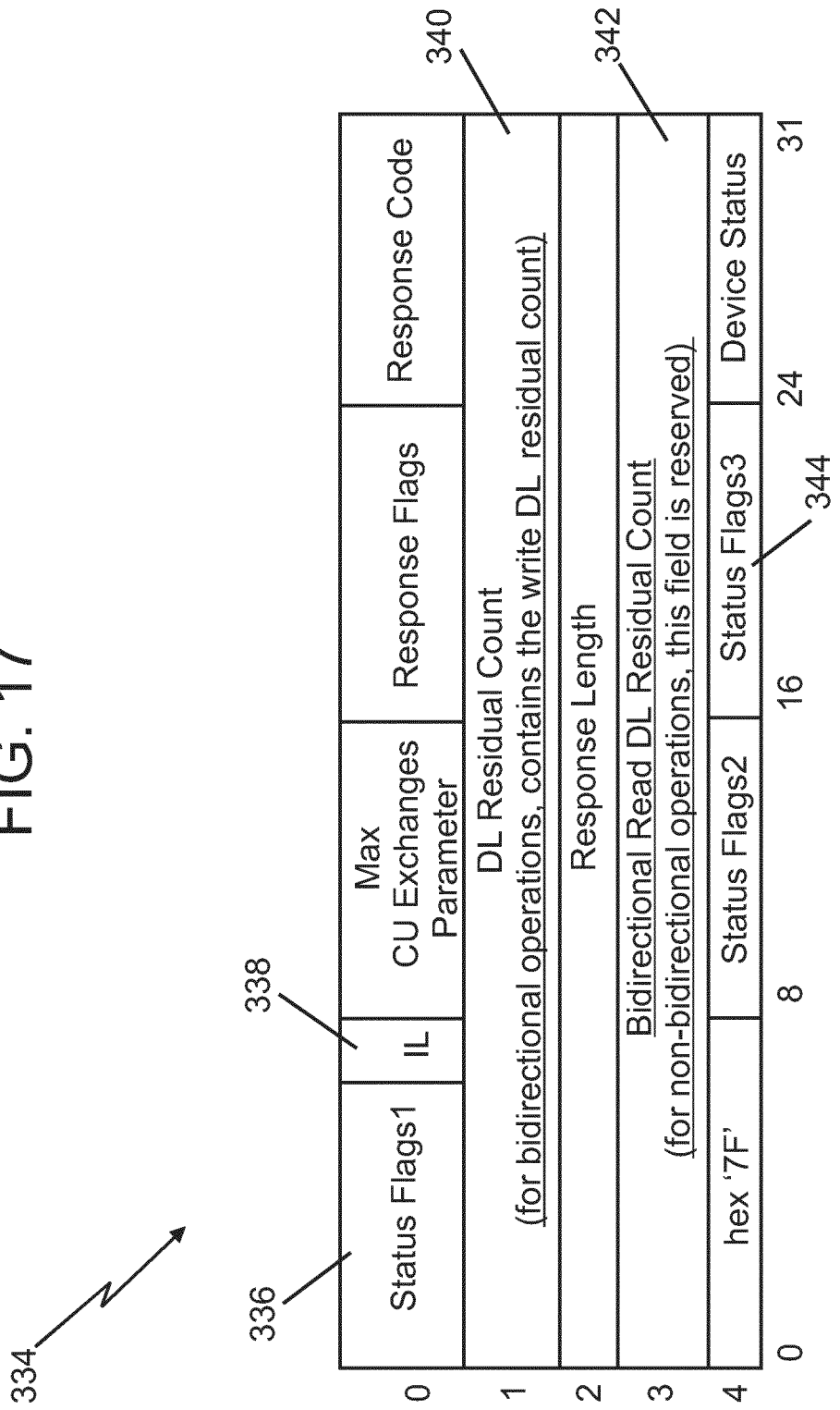

334
336
338
340
342
344
Status Flags1
IL
Max CU Exchanges Parameter
Response Flags
Response Code
DL Residual Count
(for bidirectional operations, contains the write DL residual count)
Response Length
Bidirectional Read DL Residual Count
(for non-bidirectional operations, this field is reserved)
hex '7F'
Status Flags2
Status Flags3
Device Status
0
8
16
24
31
0
1
2
3
4

FIG. 18

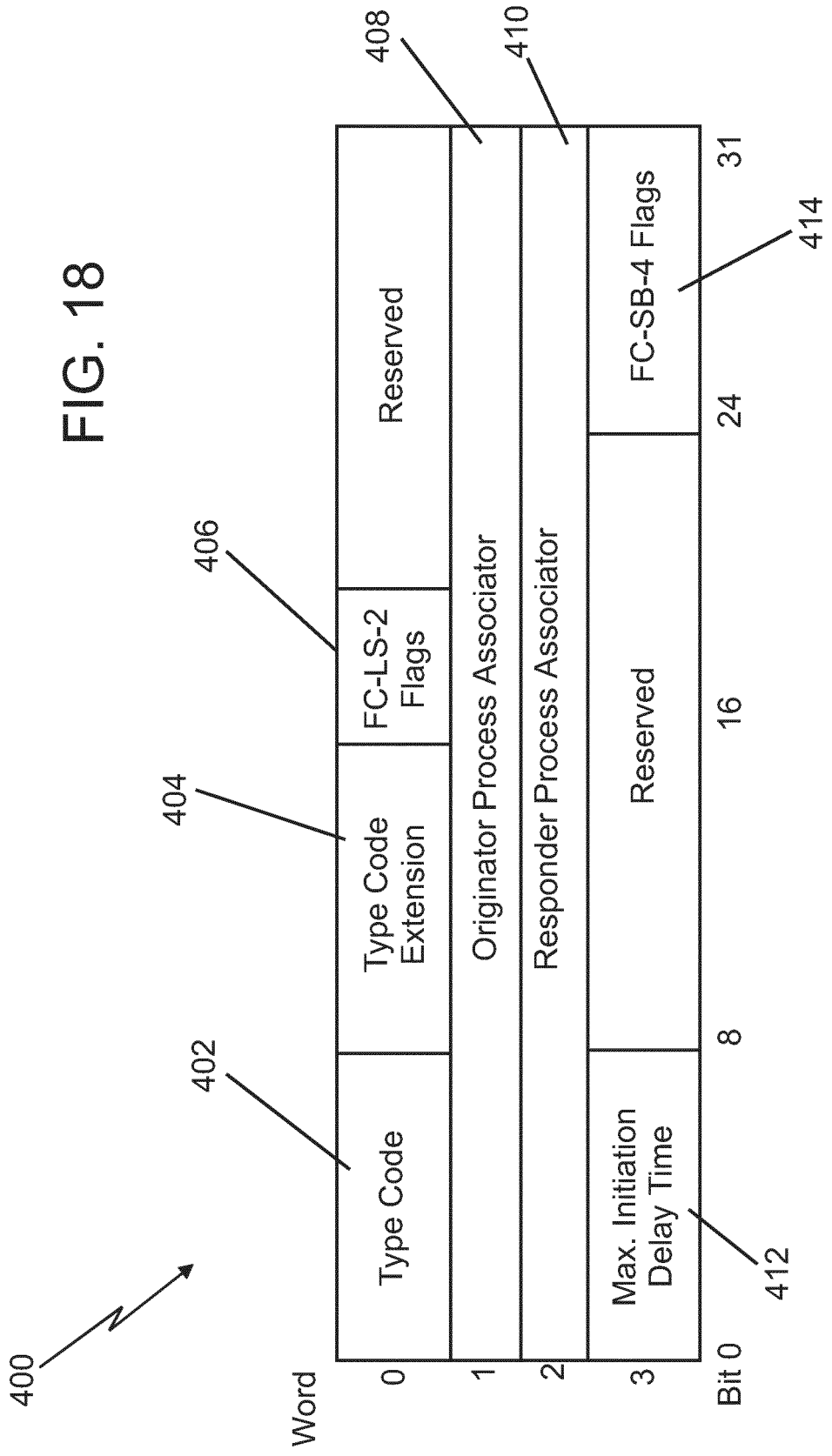

400
402
404
406
408
410
412
414
Word
Bit 0
0
1
2
3
8
16
24
31
Type Code
Type Code Extension
FC-LS-2 Flags
Reserved
Originator Process Associator
Responder Process Associator
Reserved
Max. Initiation Delay Time
Reserved
FC-SB-4 Flags

FIG. 19

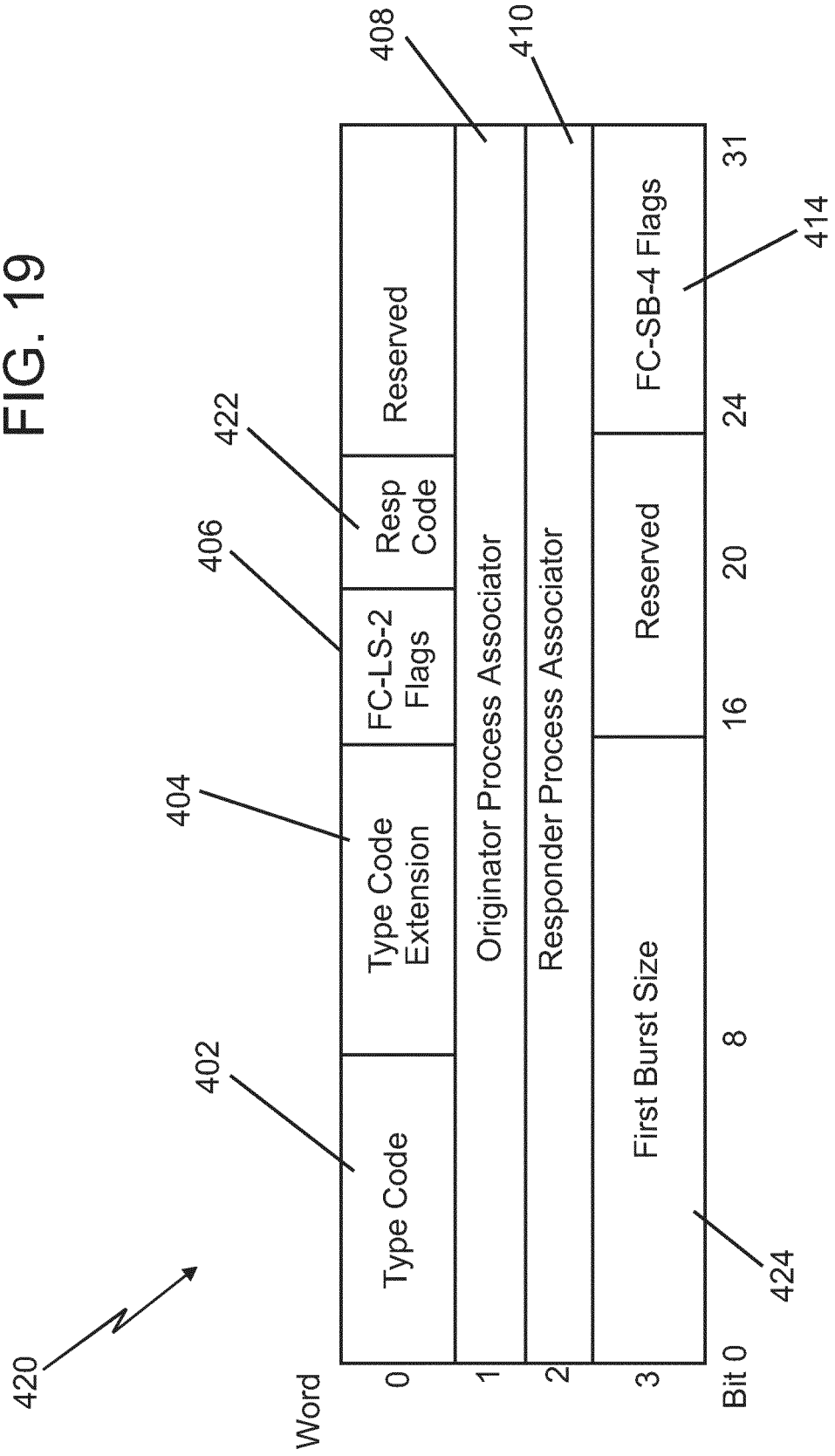

420
Word
Bit 0
0
1
2
3
8
16
20
24
31
Type Code
Type Code Extension
FC-LS-2 Flags
Resp Code
Reserved
First Burst Size
Reserved
FC-SB-4 Flags
Originator Process Associator
Responder Process Associator
402
404
406
408
410
414
422
424

FIG. 20

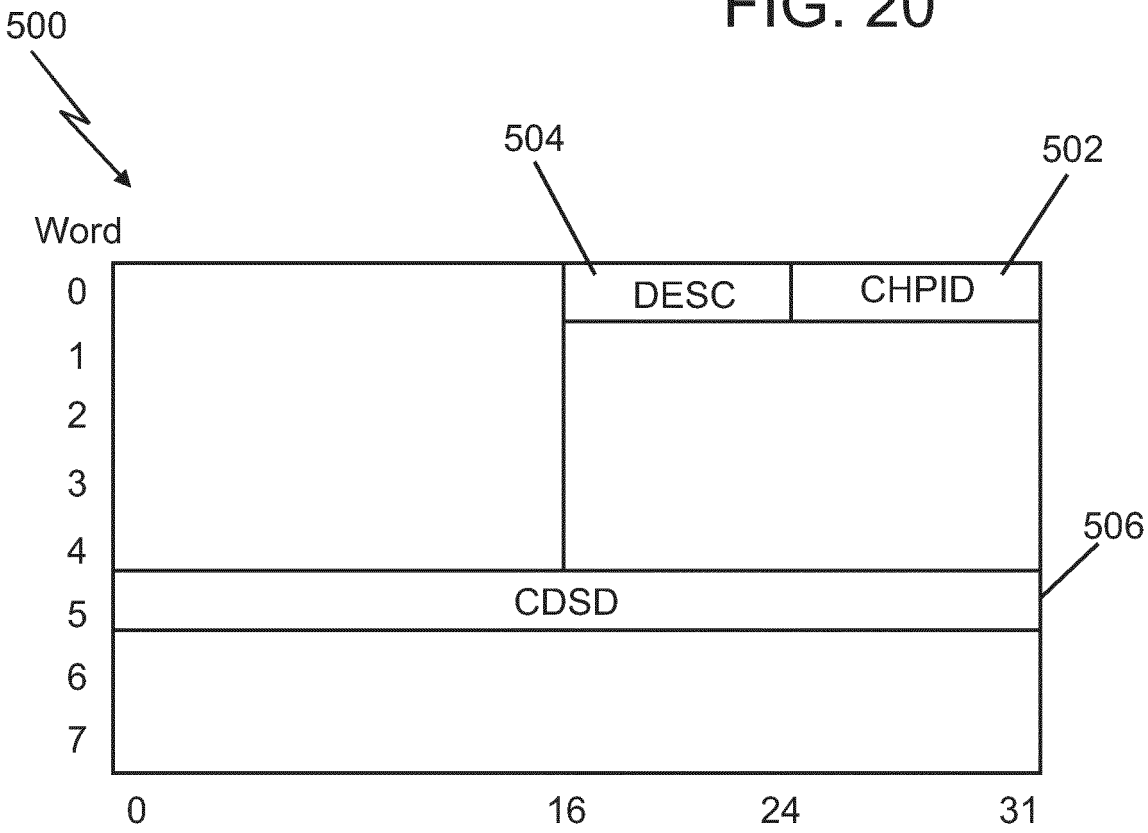
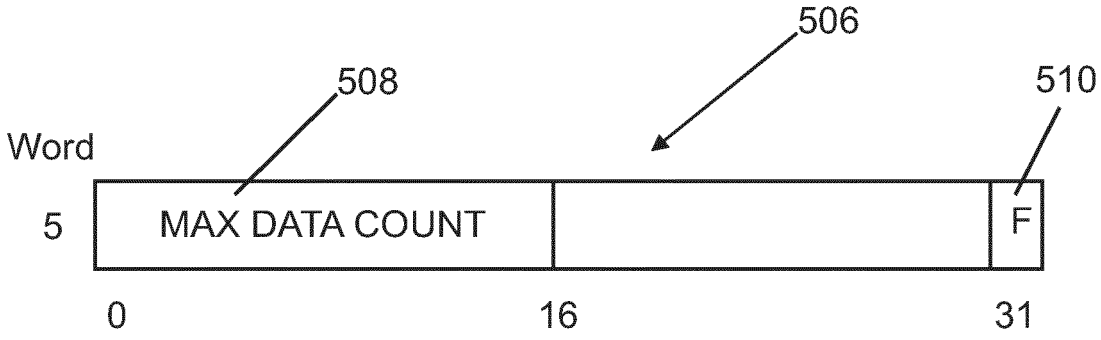

500
504
502
Word
0
1
2
3
4
5
6
7
DESC
CHPID
506
CDSD
0
16
24
31

FIG. 21


506
508
510
Word
5
MAX DATA COUNT
F
0
16
31