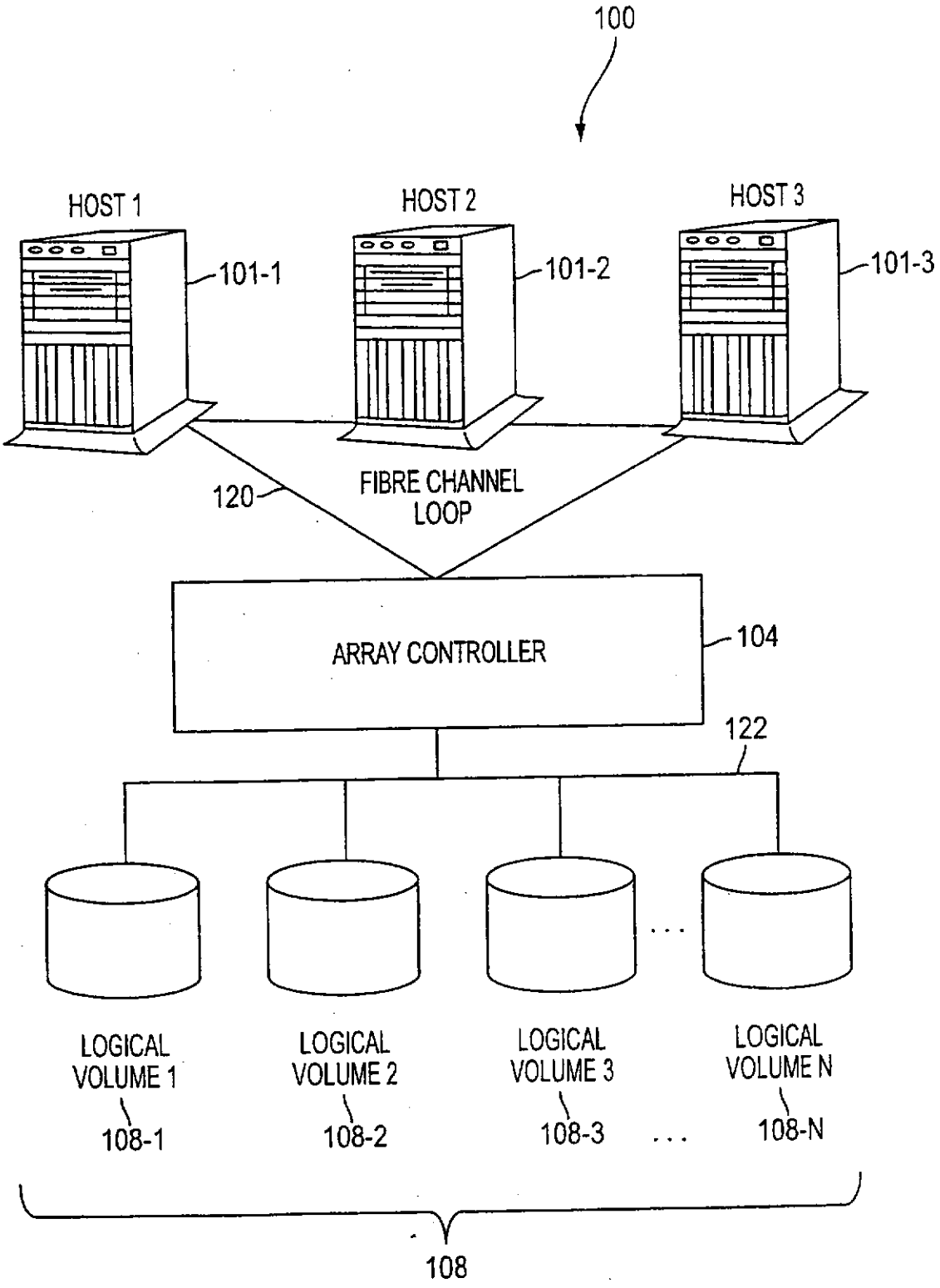

100
HOST 1
HOST 2
HOST 3
101-1
101-2
101-3
120
FIBRE CHANNEL LOOP
ARRAY CONTROLLER
104
122
LOGICAL VOLUME 1
LOGICAL VOLUME 2
LOGICAL VOLUME 3
LOGICAL VOLUME N
108-1
108-2
108-3
108-N
108

FIG. 1

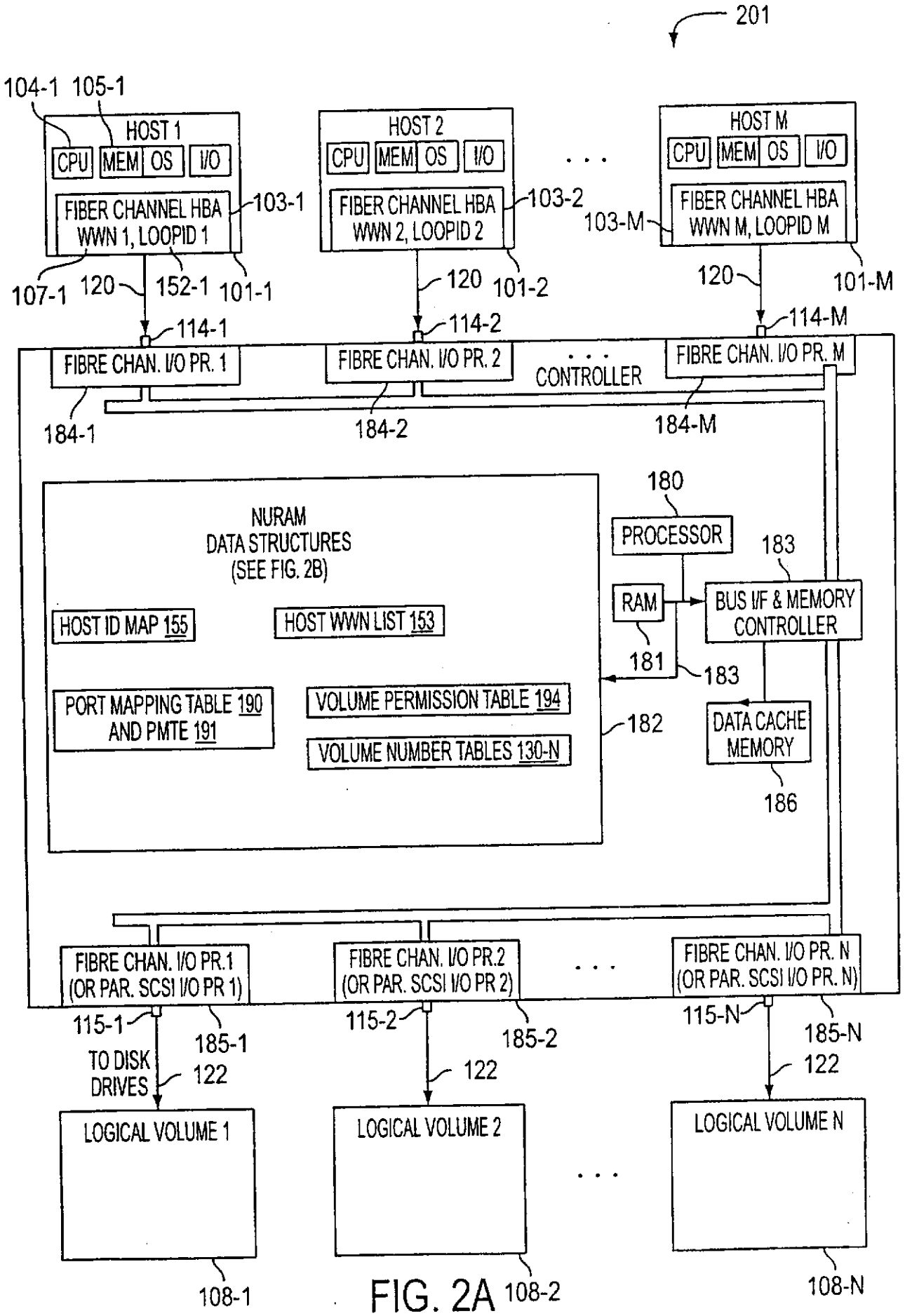

201
104-1
105-1
HOST 1
CPU
MEM
OS
I/O
FIBER CHANNEL HBA
WWN 1, LOOPID 1
103-1
HOST 2
FIBER CHANNEL HBA
WWN 2, LOOPID 2
103-2
HOST M
FIBER CHANNEL HBA
WWN M, LOOPID M
103-M
107-1
120
152-1
101-1
101-2
101-M
114-1
114-2
114-M
FIBRE CHAN. I/O PR. 1
FIBRE CHAN. I/O PR. 2
FIBRE CHAN. I/O PR. M
CONTROLLER
184-1
184-2
184-M
NURAM
DATA STRUCTURES
(SEE FIG. 2B)
HOST ID MAP 155
HOST WWN LIST 153
PORT MAPPING TABLE 190
AND PMTE 191
VOLUME PERMISSION TABLE 194
VOLUME NUMBER TABLES 130-N
182
180
PROCESSOR
183
RAM
BUS I/F & MEMORY
CONTROLLER
181
DATA CACHE
MEMORY
186
FIBRE CHAN. I/O PR.1
(OR PAR. SCSI I/O PR 1)
FIBRE CHAN. I/O PR.2
(OR PAR. SCSI I/O PR 2)
FIBRE CHAN. I/O PR. N
(OR PAR. SCSI I/O PR. N)
115-1
115-2
115-N
185-1
185-2
185-N
TO DISK
DRIVES
122
LOGICAL VOLUME 1
LOGICAL VOLUME 2
LOGICAL VOLUME N
108-1
108-2
108-N

FIG. 2A

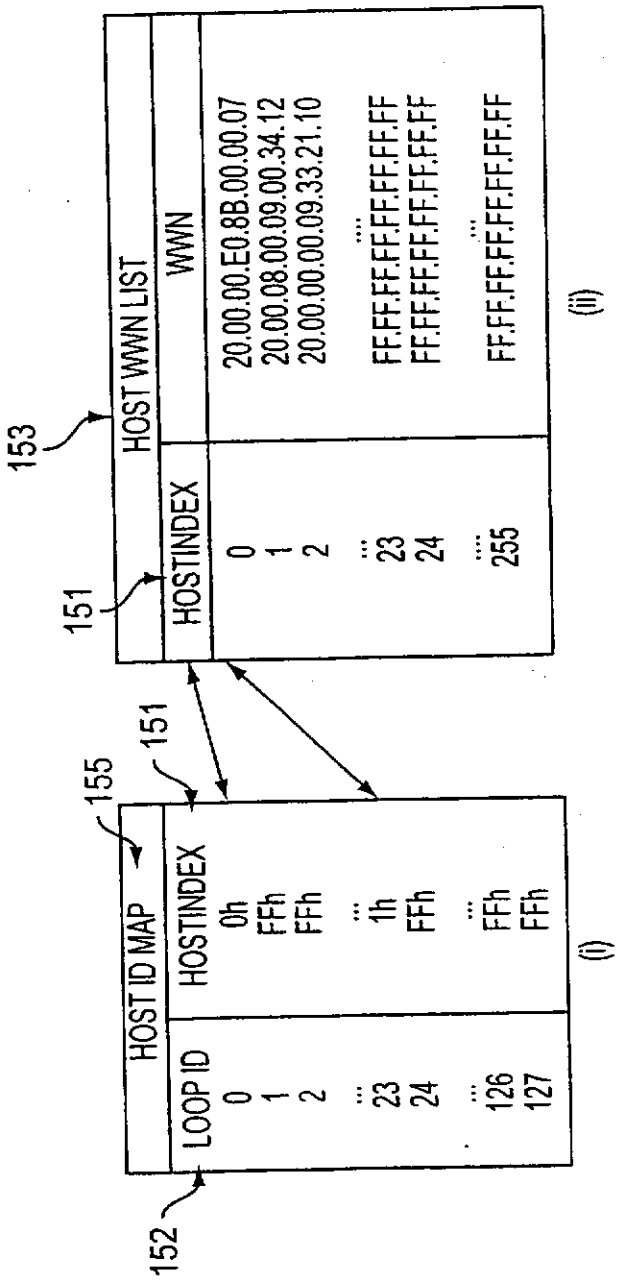

153
HOST WWN LIST
WWN
HOSTINDEX
0
1
2
...
23
24
...
255
20.00.00.E0.8B.00.00.07
20.00.08.00.09.00.34.12
20.00.00.00.09.33.21.10
....
FF.FF.FF.FF.FF.FF.FF.FF
FF.FF.FF.FF.FF.FF.FF.FF
....
FF.FF.FF.FF.FF.FF.FF.FF
(ii)
151
155
151
HOST ID MAP
LOOP ID
HOSTINDEX
0
1
2
...
23
24
...
126
127
0h
FFh
FFh
...
1h
FFh
...
FFh
FFh
(i)
152

FIG. 2B-1

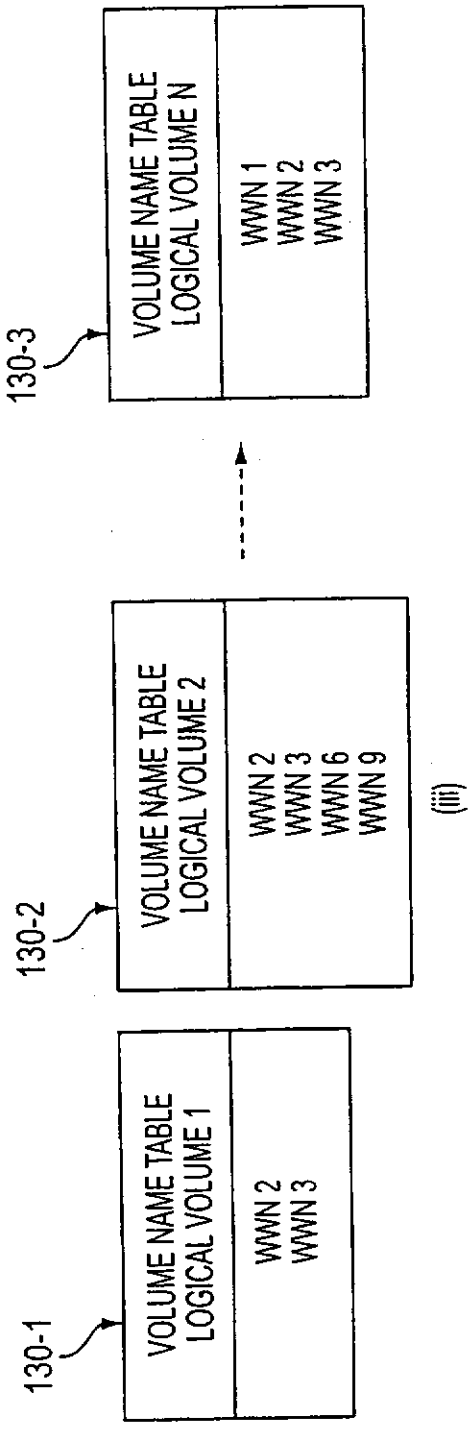

130-3
VOLUME NAME TABLE
LOGICAL VOLUME N
WWN 1
WWN 2
WWN 3
130-2
VOLUME NAME TABLE
LOGICAL VOLUME 2
WWN 2
WWN 3
WWN 6
WWN 9
(iii)
130-1
VOLUME NAME TABLE
LOGICAL VOLUME 1
WWN 2
WWN 3

FIG. 2B-2

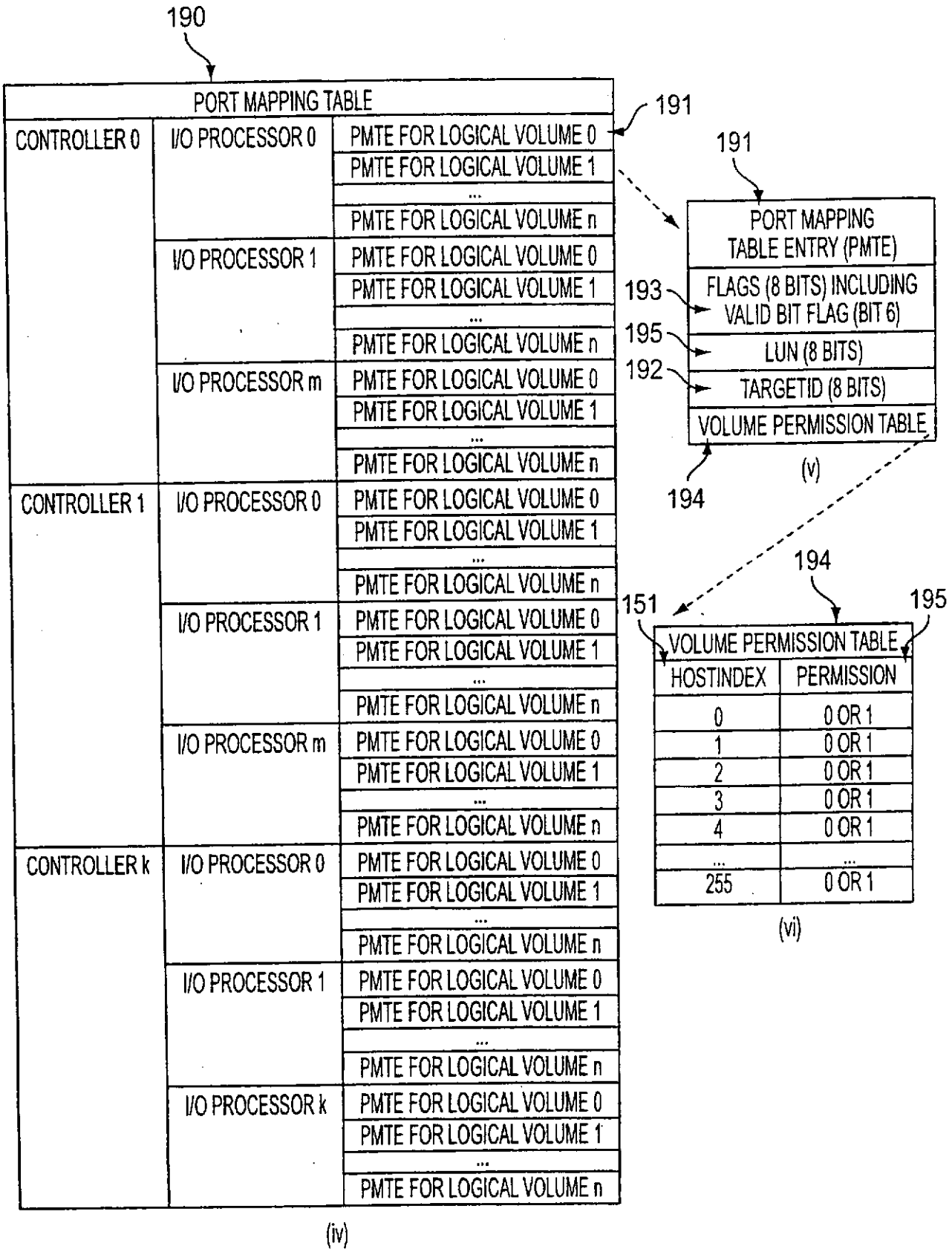

190
PORT MAPPING TABLE
CONTROLLER 0
I/O PROCESSOR 0
PMTE FOR LOGICAL VOLUME 0
PMTE FOR LOGICAL VOLUME 1
...
PMTE FOR LOGICAL VOLUME n
I/O PROCESSOR 1
PMTE FOR LOGICAL VOLUME 0
PMTE FOR LOGICAL VOLUME 1
...
PMTE FOR LOGICAL VOLUME n
I/O PROCESSOR m
PMTE FOR LOGICAL VOLUME 0
PMTE FOR LOGICAL VOLUME 1
...
PMTE FOR LOGICAL VOLUME n
CONTROLLER 1
I/O PROCESSOR 0
PMTE FOR LOGICAL VOLUME 0
PMTE FOR LOGICAL VOLUME 1
...
PMTE FOR LOGICAL VOLUME n
I/O PROCESSOR 1
PMTE FOR LOGICAL VOLUME 0
PMTE FOR LOGICAL VOLUME 1
...
PMTE FOR LOGICAL VOLUME n
I/O PROCESSOR m
PMTE FOR LOGICAL VOLUME 0
PMTE FOR LOGICAL VOLUME 1
...
PMTE FOR LOGICAL VOLUME n
CONTROLLER k
I/O PROCESSOR 0
PMTE FOR LOGICAL VOLUME 0
PMTE FOR LOGICAL VOLUME 1
...
PMTE FOR LOGICAL VOLUME n
I/O PROCESSOR 1
PMTE FOR LOGICAL VOLUME 0
PMTE FOR LOGICAL VOLUME 1
...
PMTE FOR LOGICAL VOLUME n
I/O PROCESSOR k
PMTE FOR LOGICAL VOLUME 0
PMTE FOR LOGICAL VOLUME 1
...
PMTE FOR LOGICAL VOLUME n
(iv)
191
191
PORT MAPPING TABLE ENTRY (PMTE)
193
FLAGS (8 BITS) INCLUDING VALID BIT FLAG (BIT 6)
195
LUN (8 BITS)
192
TARGETID (8 BITS)
VOLUME PERMISSION TABLE
194
(v)
194
151
195
VOLUME PERMISSION TABLE
HOSTINDEX
PERMISSION
0
0 OR 1
1
0 OR 1
2
0 OR 1
3
0 OR 1
4
0 OR 1
...
...
255
0 OR 1
(vi)

FIG. 2B-3

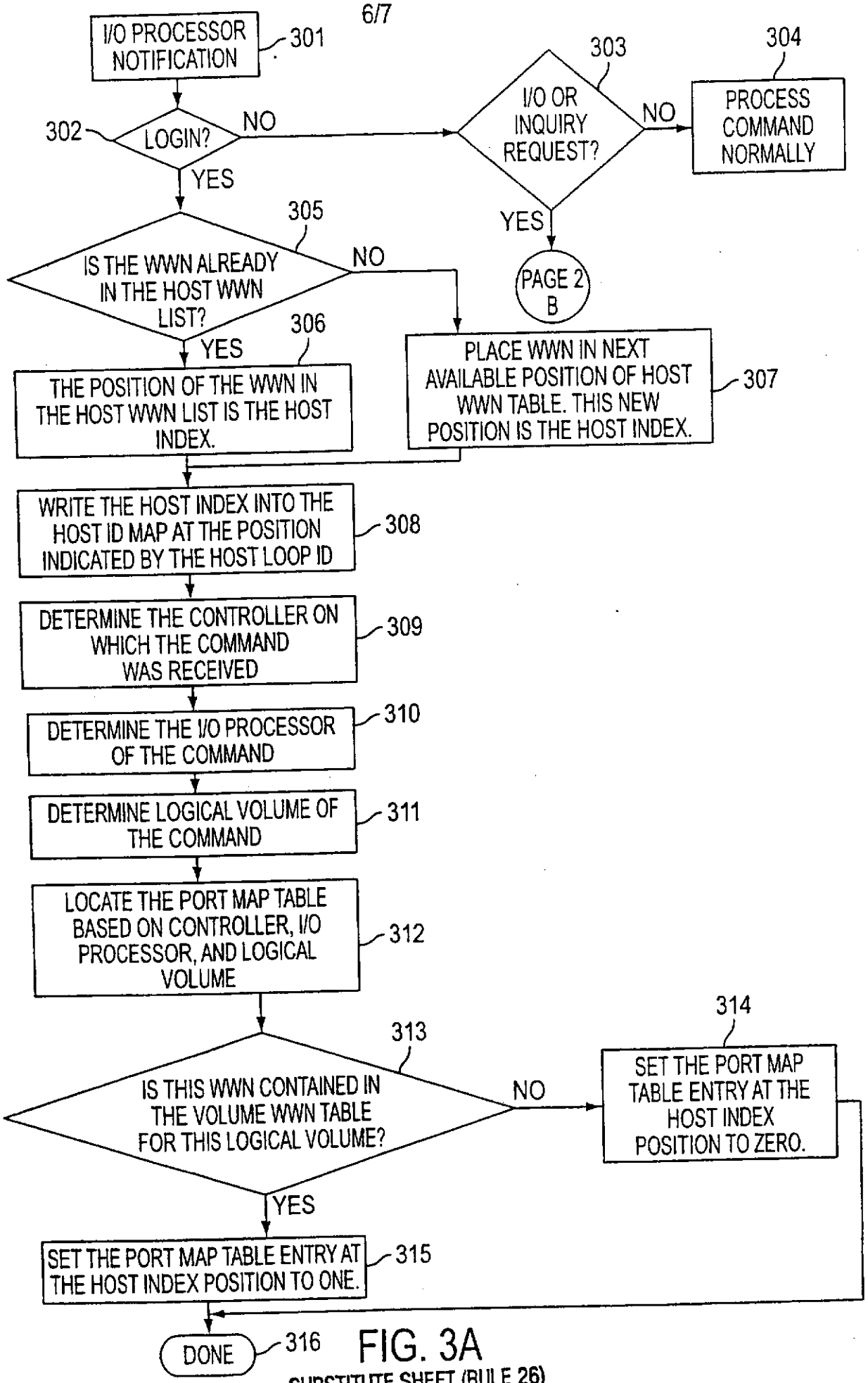

I/O PROCESSOR NOTIFICATION
301
LOGIN?
302
NO
YES
I/O OR INQUIRY REQUEST?
303
NO
PROCESS COMMAND NORMALLY
304
YES
PAGE 2 B
IS THE WWN ALREADY IN THE HOST WWN LIST?
305
NO
YES
THE POSITION OF THE WWN IN THE HOST WWN LIST IS THE HOST INDEX.
306
PLACE WWN IN NEXT AVAILABLE POSITION OF HOST WWN TABLE. THIS NEW POSITION IS THE HOST INDEX.
307
WRITE THE HOST INDEX INTO THE HOST ID MAP AT THE POSITION INDICATED BY THE HOST LOOP ID
308
DETERMINE THE CONTROLLER ON WHICH THE COMMAND WAS RECEIVED
309
DETERMINE THE I/O PROCESSOR OF THE COMMAND
310
DETERMINE LOGICAL VOLUME OF THE COMMAND
311
LOCATE THE PORT MAP TABLE BASED ON CONTROLLER, I/O PROCESSOR, AND LOGICAL VOLUME
312
IS THIS WWN CONTAINED IN THE VOLUME WWN TABLE FOR THIS LOGICAL VOLUME?
313
NO
SET THE PORT MAP TABLE ENTRY AT THE HOST INDEX POSITION TO ZERO.
314
YES
SET THE PORT MAP TABLE ENTRY AT THE HOST INDEX POSITION TO ONE.
315
DONE
316

FIG. 3A

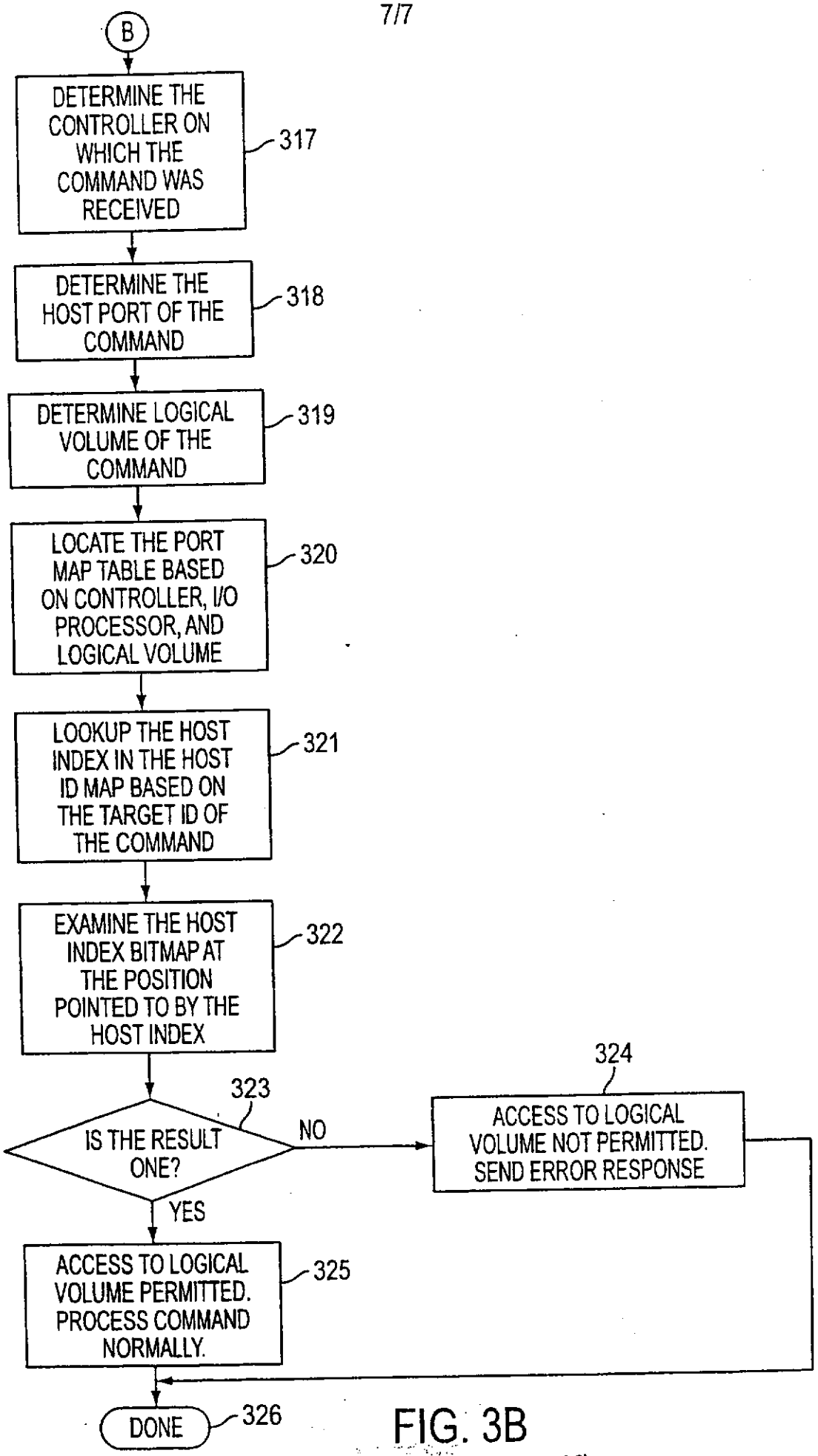

B
DETERMINE THE CONTROLLER ON WHICH THE COMMAND WAS RECEIVED
317
DETERMINE THE HOST PORT OF THE COMMAND
318
DETERMINE LOGICAL VOLUME OF THE COMMAND
319
LOCATE THE PORT MAP TABLE BASED ON CONTROLLER, I/O PROCESSOR, AND LOGICAL VOLUME
320
LOOKUP THE HOST INDEX IN THE HOST ID MAP BASED ON THE TARGET ID OF THE COMMAND
321
EXAMINE THE HOST INDEX BITMAP AT THE POSITION POINTED TO BY THE HOST INDEX
322
323
IS THE RESULT ONE?
NO
324
ACCESS TO LOGICAL VOLUME NOT PERMITTED. SEND ERROR RESPONSE
YES
ACCESS TO LOGICAL VOLUME PERMITTED. PROCESS COMMAND NORMALLY.
325
DONE
326

FIG. 3B