

FIG.1A

DIGITAL WATERMARK EMBEDDING

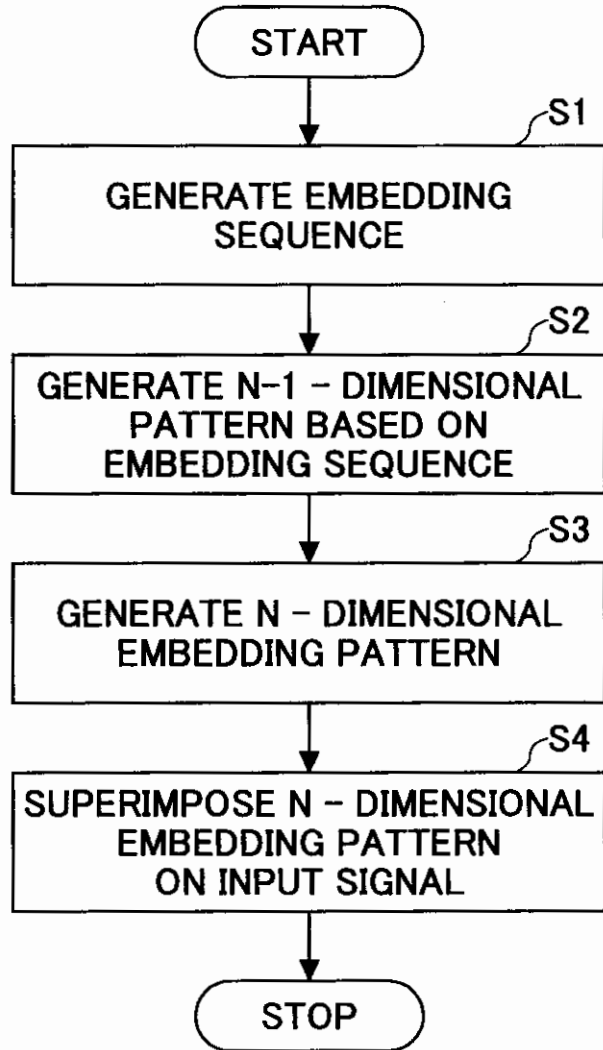


FIG.1B

DIGITAL WATERMARK DETECTION

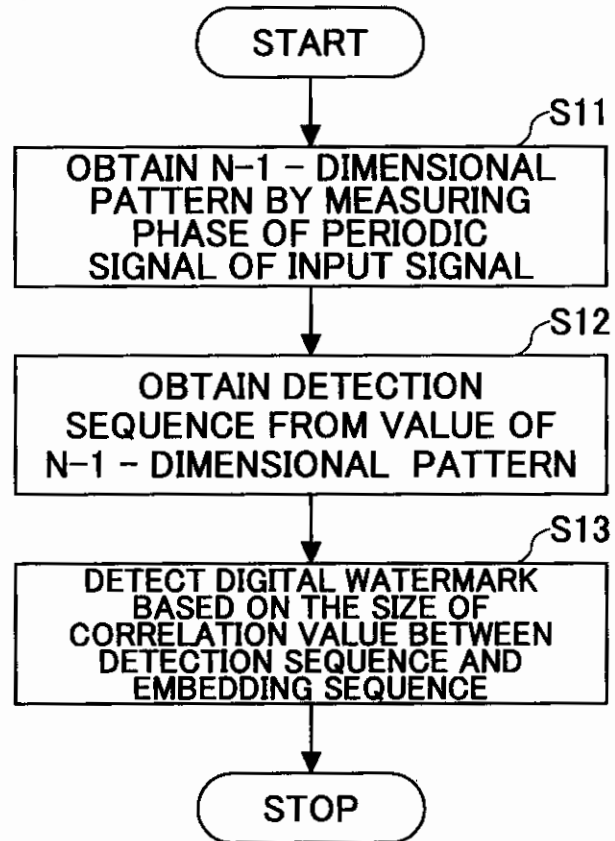


FIG.2

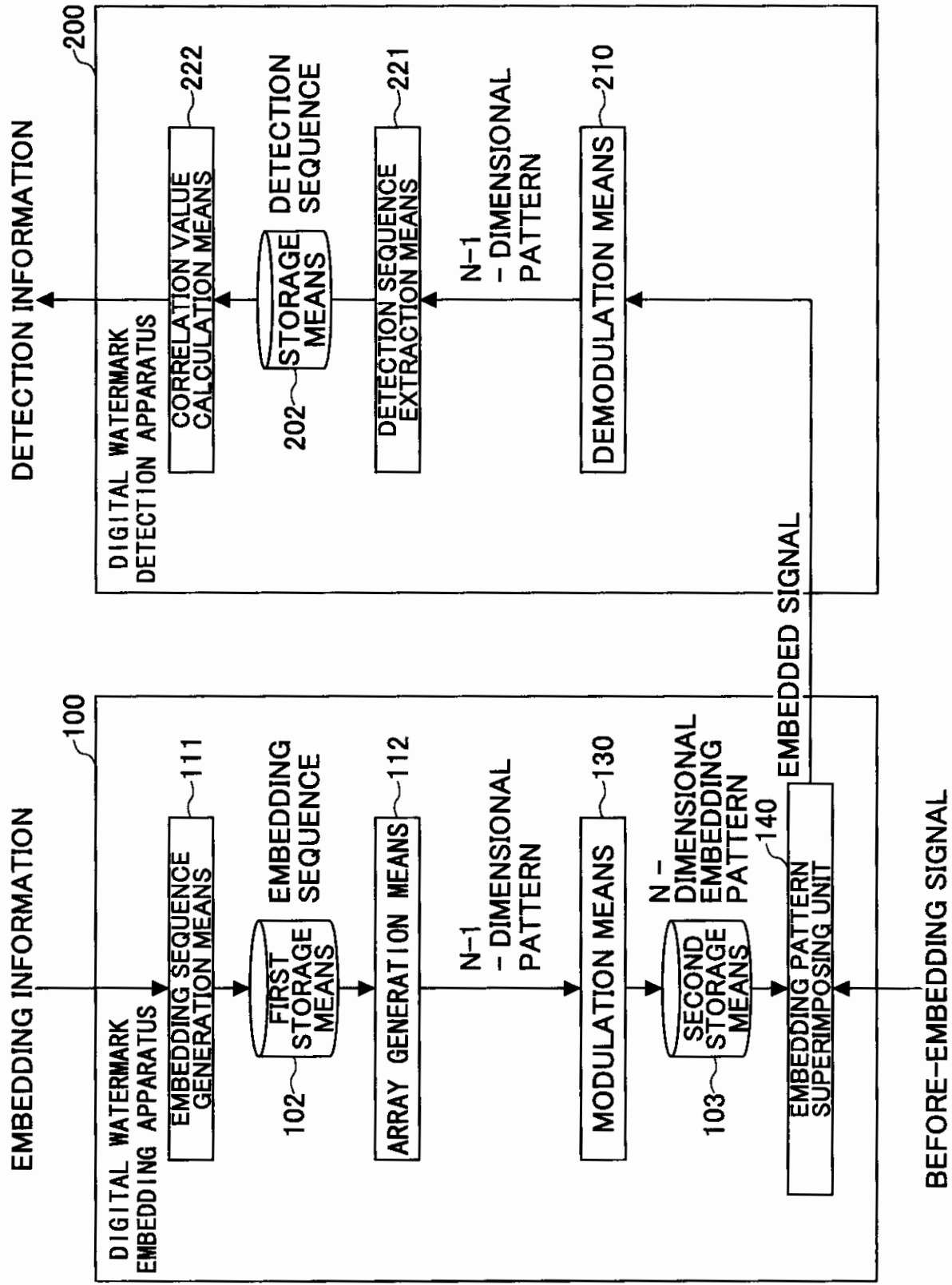


FIG.3

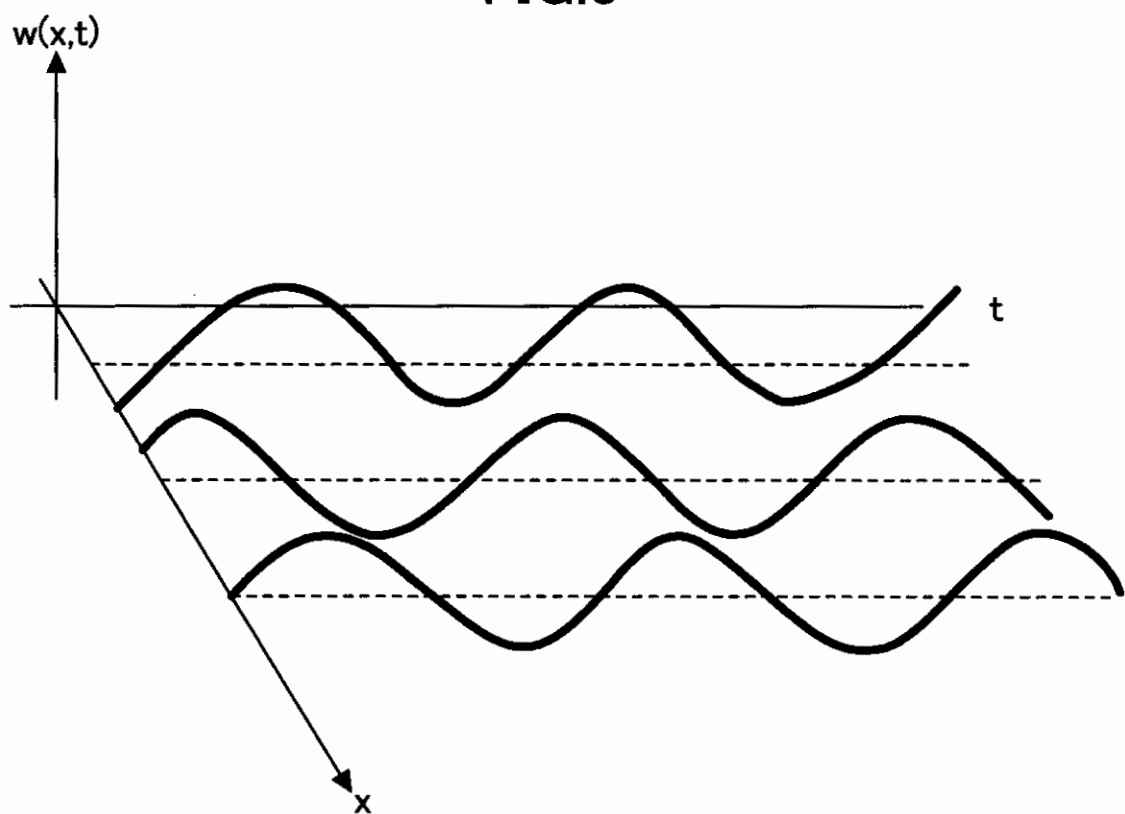
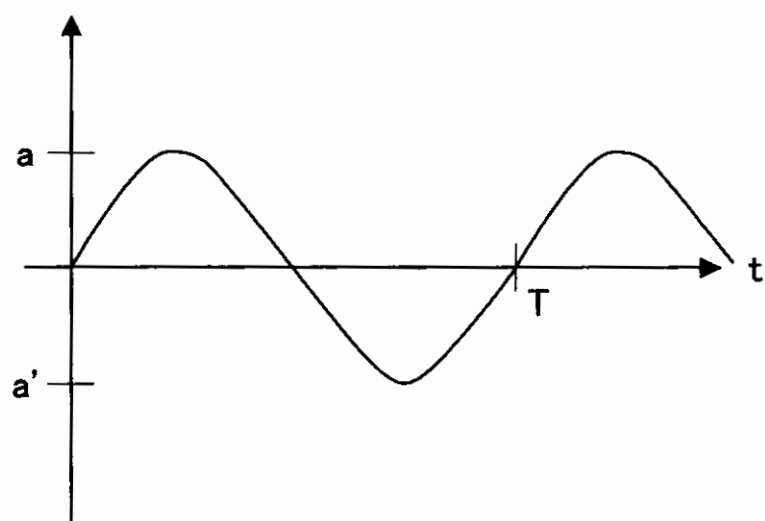
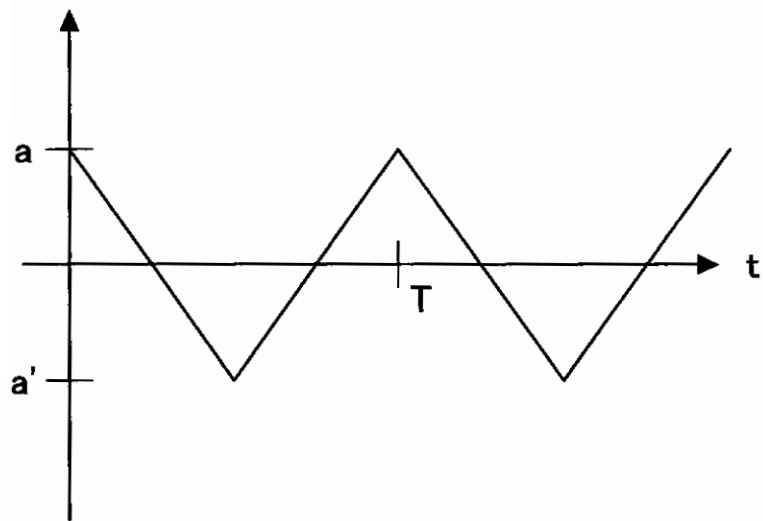


FIG.4A



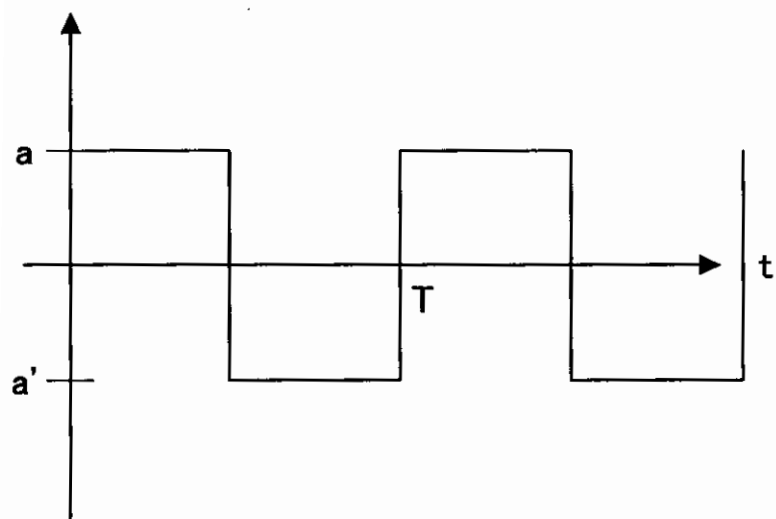
(a) SINE WAVE

FIG.4B



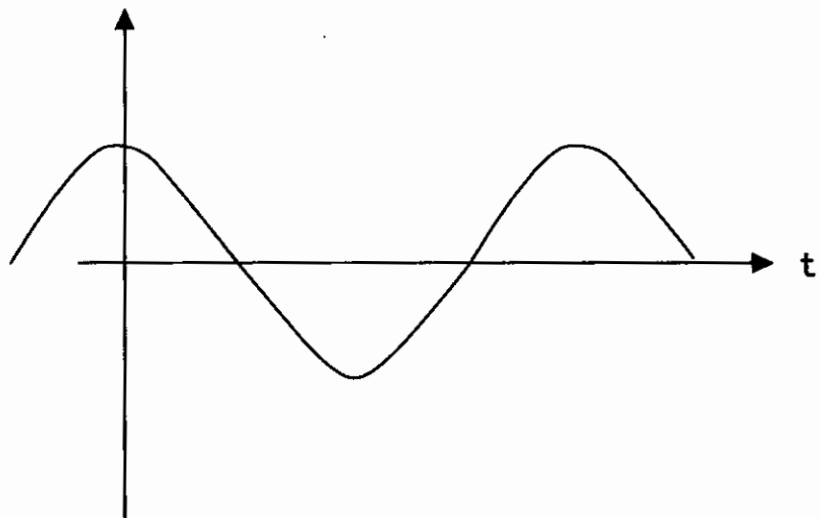
(b) TRIANGULAR WAVE

FIG.4C



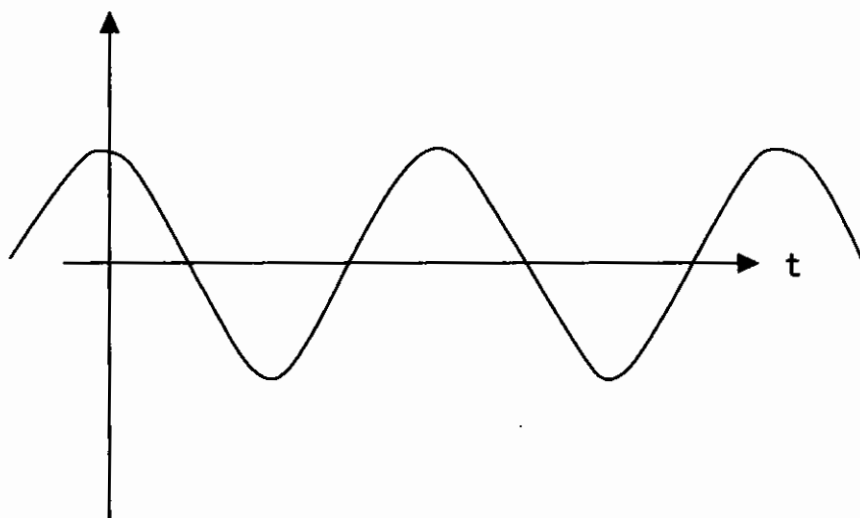
(c) RECTANGULAR WAVE

FIG.5A



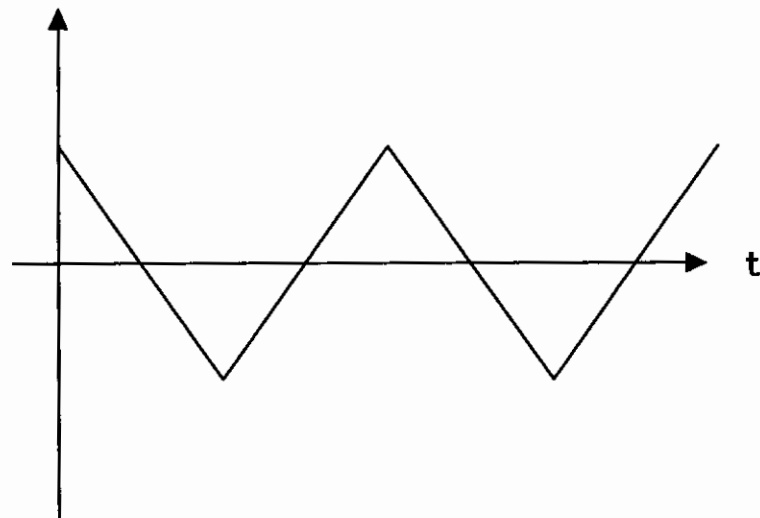
(a) AUTOCORRELATION FUNCTION OF SINE WAVE

FIG.5B



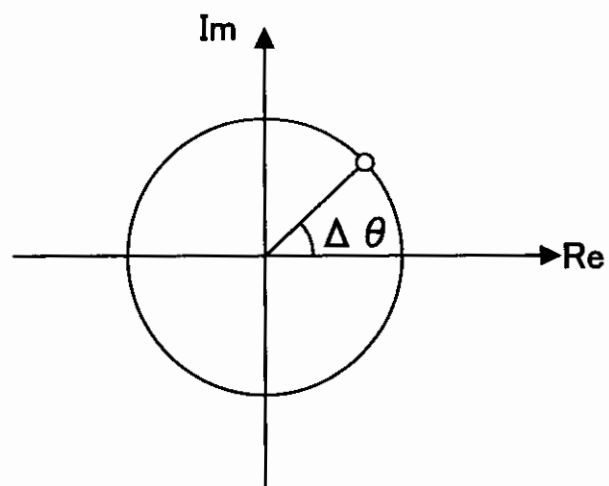
(b) AUTOCORRELATION FUNCTION OF TRIANGULAR WAVE

FIG.5C



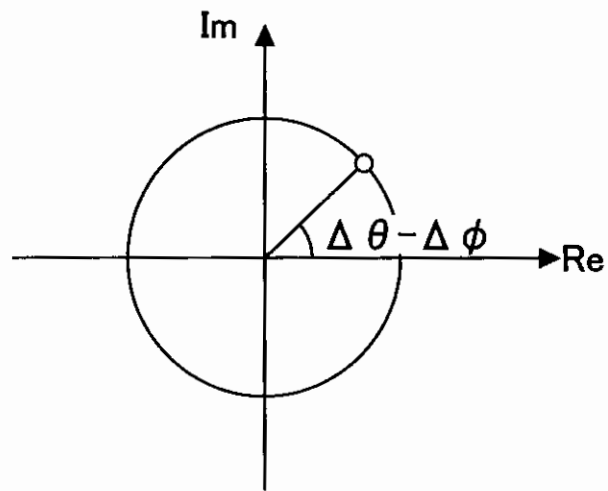
(c) AUTOCORRELATION FUNCTION OF RECTANGULAR WAVE

FIG.6A



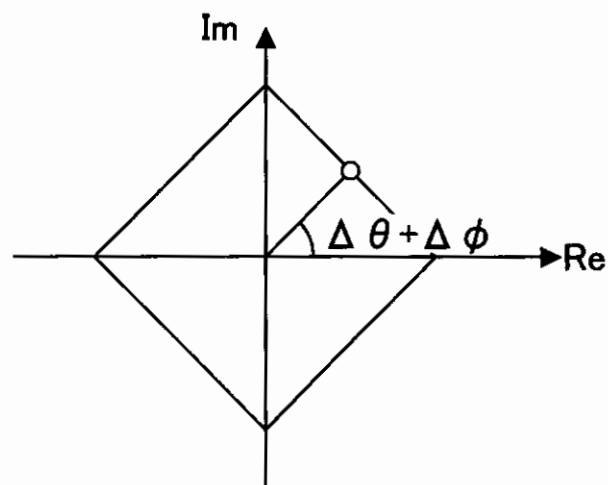
(a) WHEN PERIODIC SIGNAL IS SINE WAVE

FIG.6B



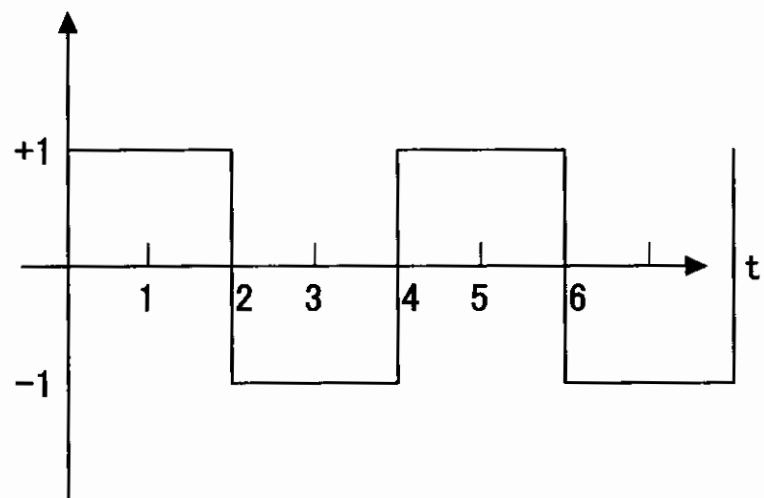
(b) WHEN TRIANGULAR WAVE

FIG.6C



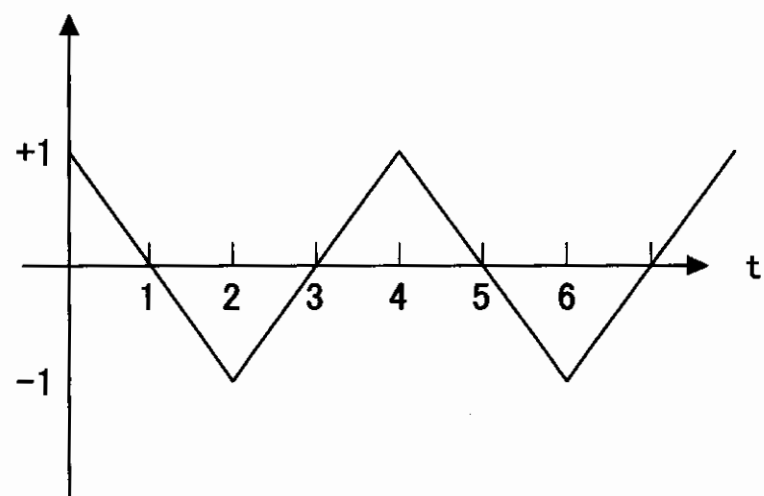
(c) WHEN PERIODIC SIGNAL IS RECTANGULAR WAVE

FIG.7A



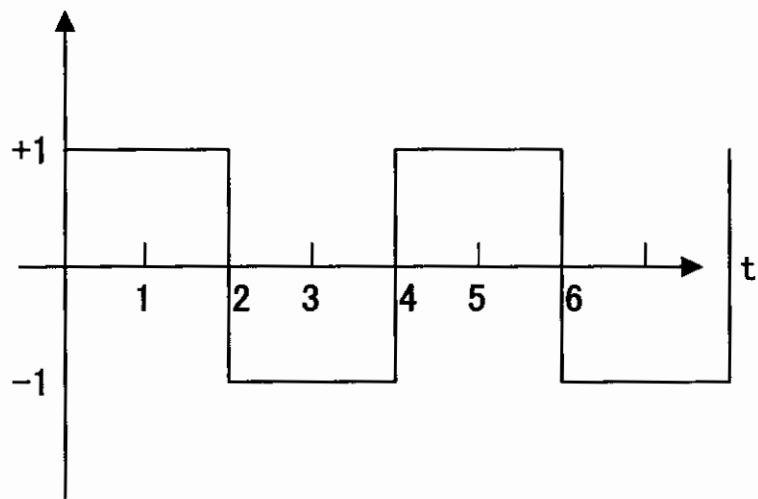
$f_1(t)$: RECTANGULAR WAVE

FIG.7B



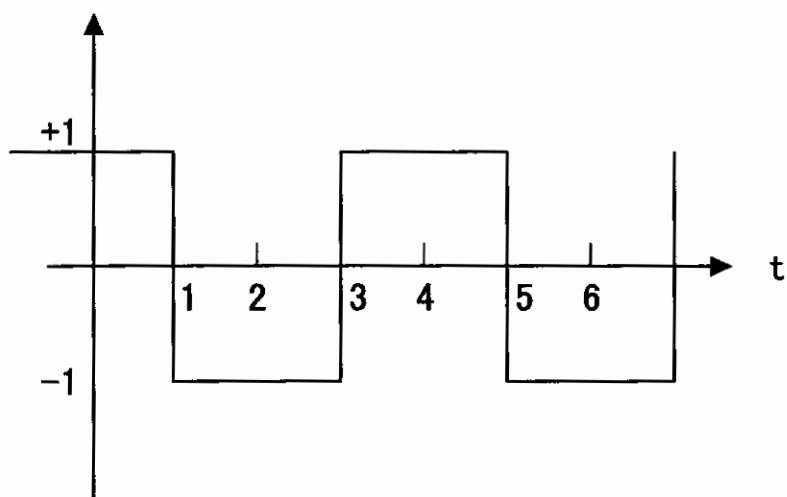
$f_2(t)$: TRIANGULAR WAVE

FIG.8A



$G_1(t)$: NO DESYNCHRONIZATION

FIG.8B



$G_2(t)$: THERE IS DESYNCHRONIZATION

FIG.9

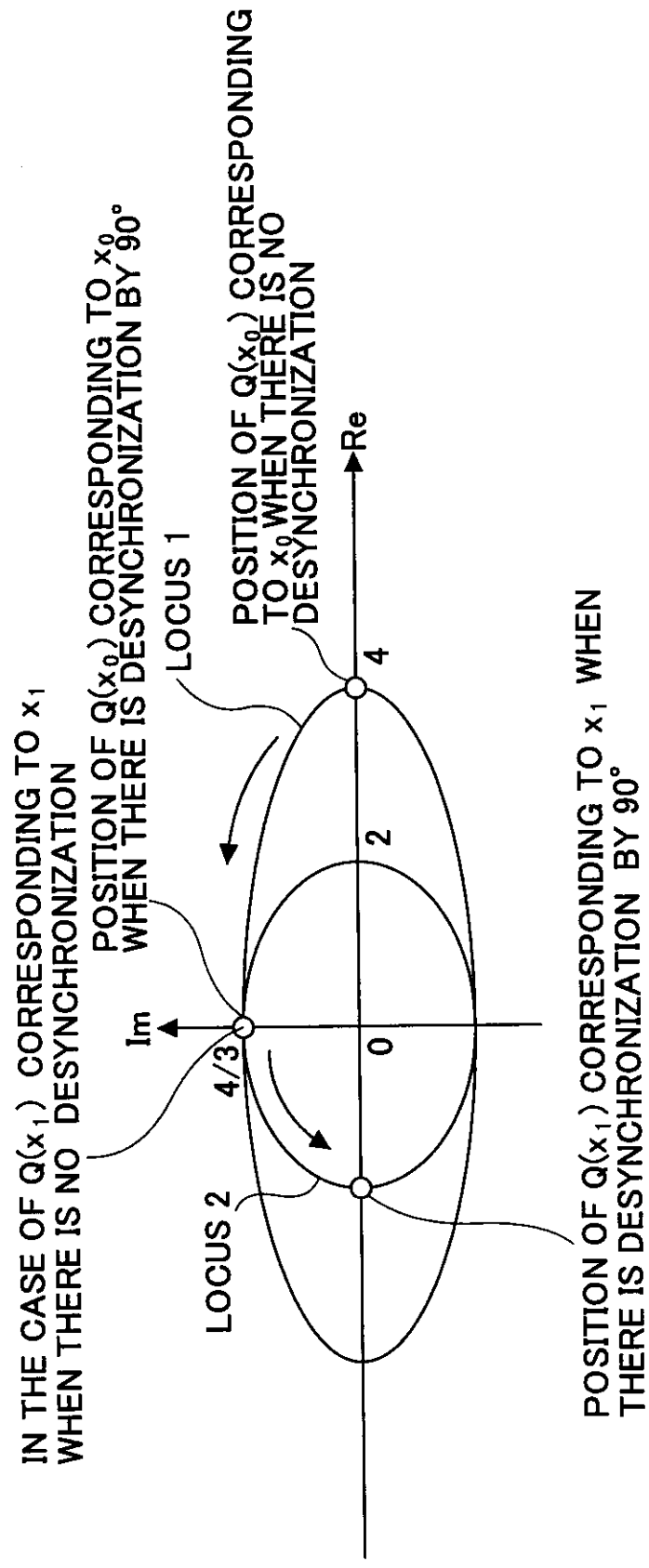


FIG.10

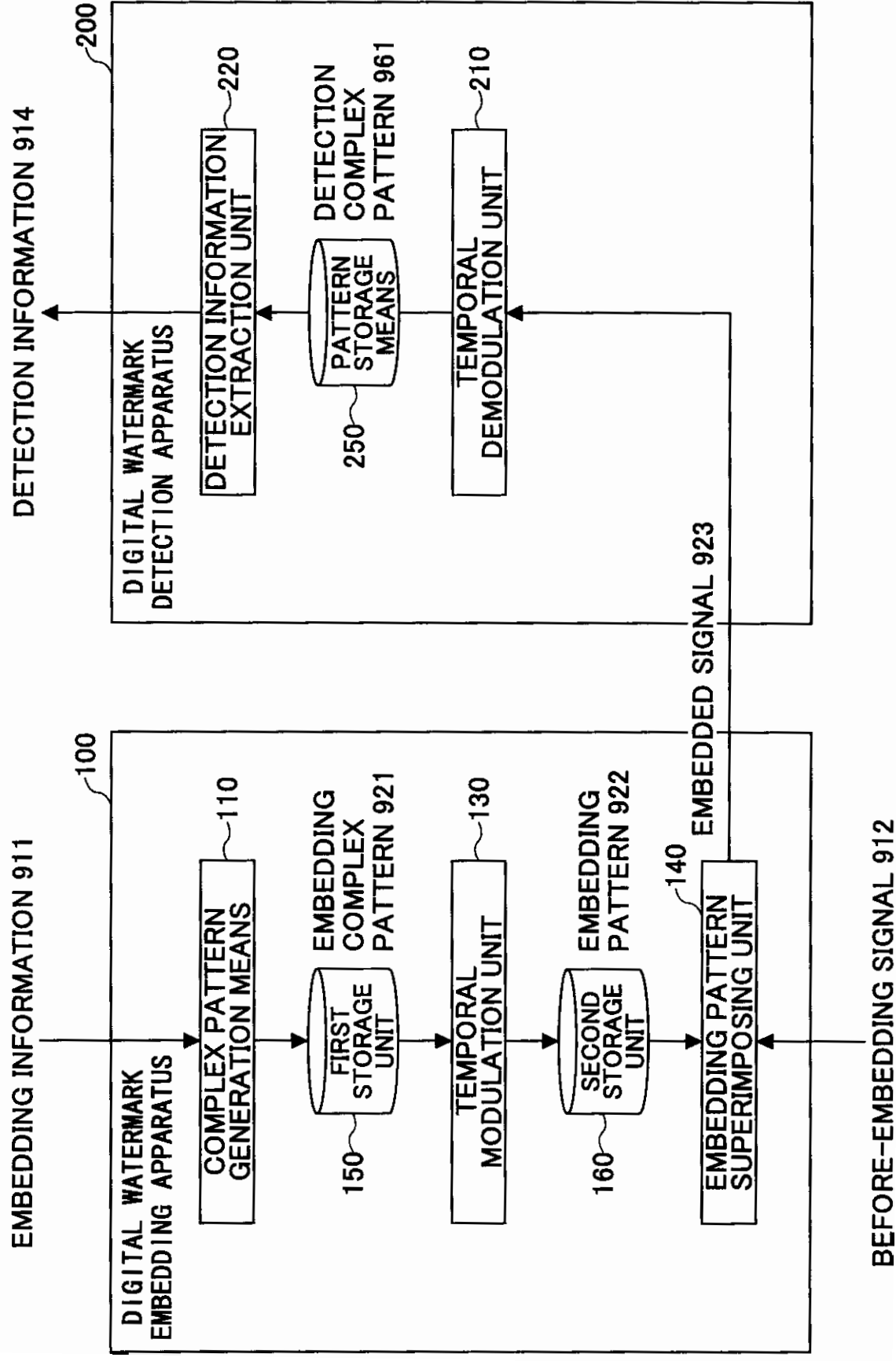


FIG.11

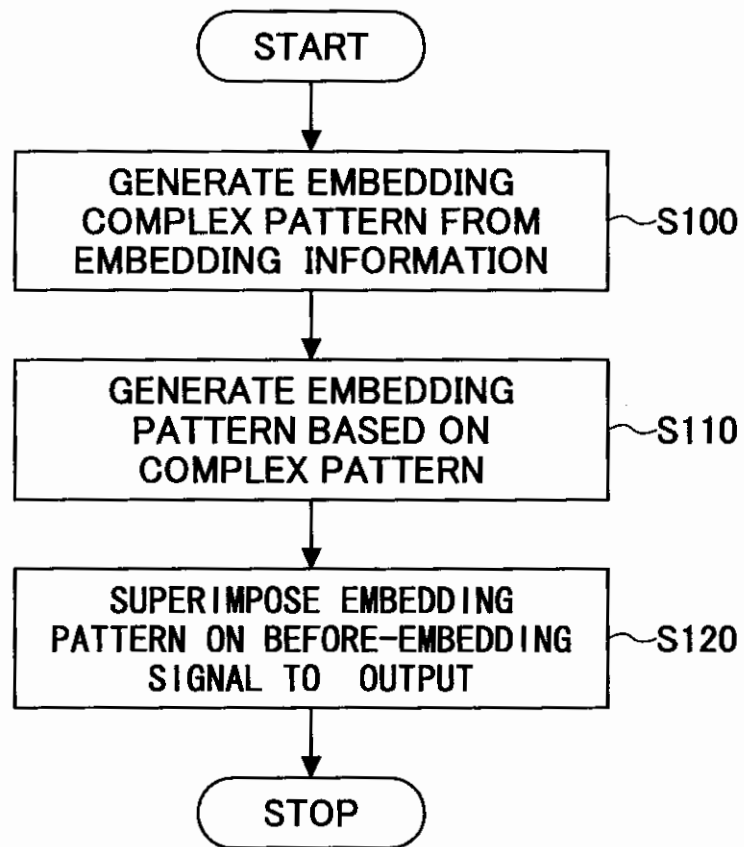


FIG.12

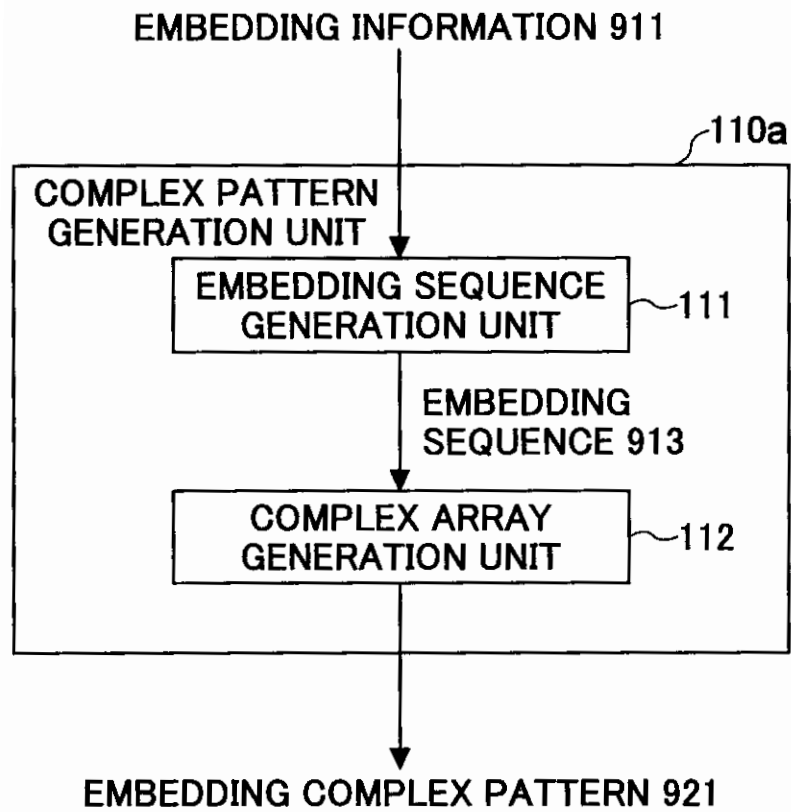


FIG.13

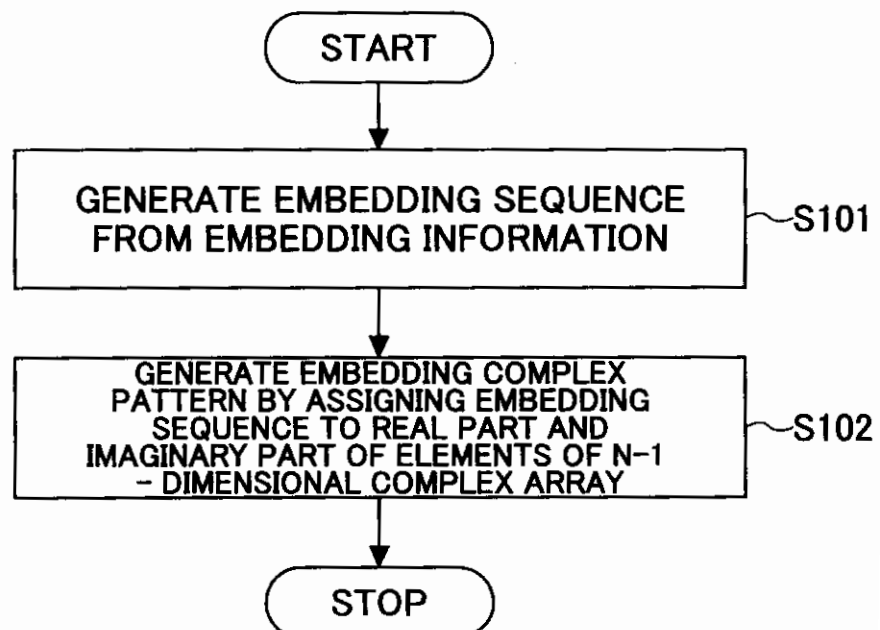


FIG.14

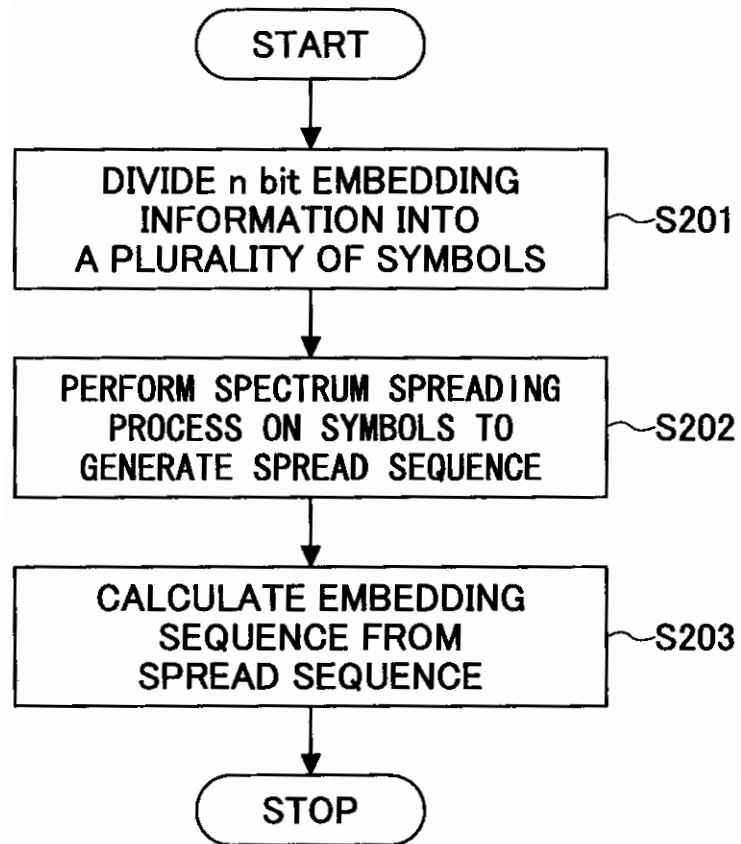


FIG.15

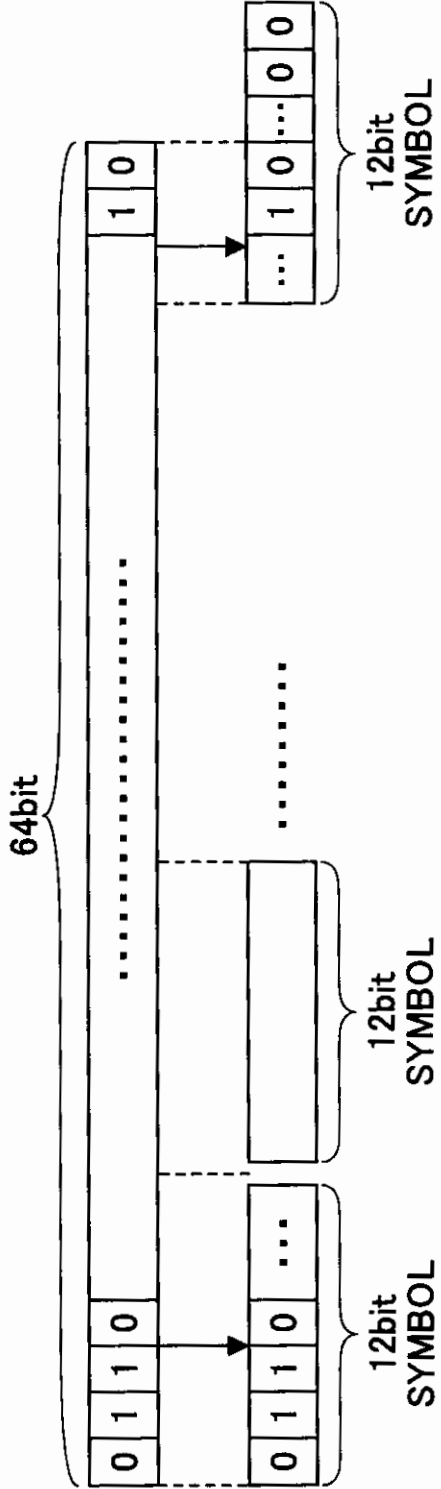


FIG.16

```
graph TD; START([START]) --> S301[PREPARE N-1 - DIMENSIONAL COMPLEX ARRAY]; S301 --> S302[SET VALUES IN ARRAY SUCH THAT VALUES EXTRACTED FROM EMBEDDING SEQUENCE BECOME REAL PART AND IMAGINARY PART OF THE ELEMENT VALUES]; S302 --> S303[OUTPUT COMPLEX ARRAY AS COMPLEX PATTERN]; S303 --> STOP([STOP]);
```

FIG.17

$w_1 + jw_2$	$w_3 + jw_4$	$w_5 + jw_6$	$w_7 + jw_8$	
		⋮		

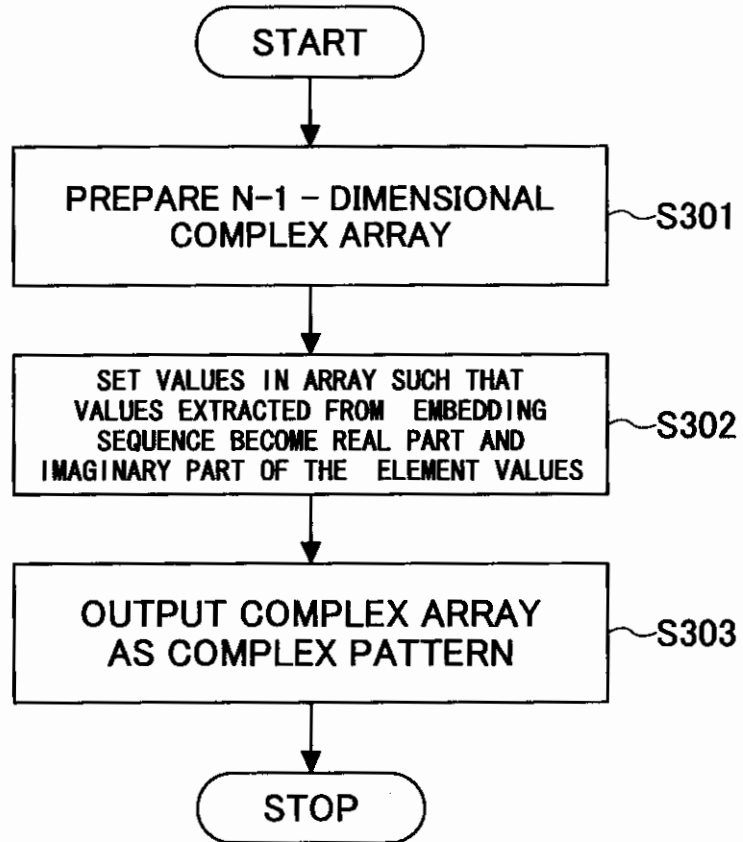


FIG.17

[illegible]

FIG.18

EMBEDDING COMPLEX PATTERN 921

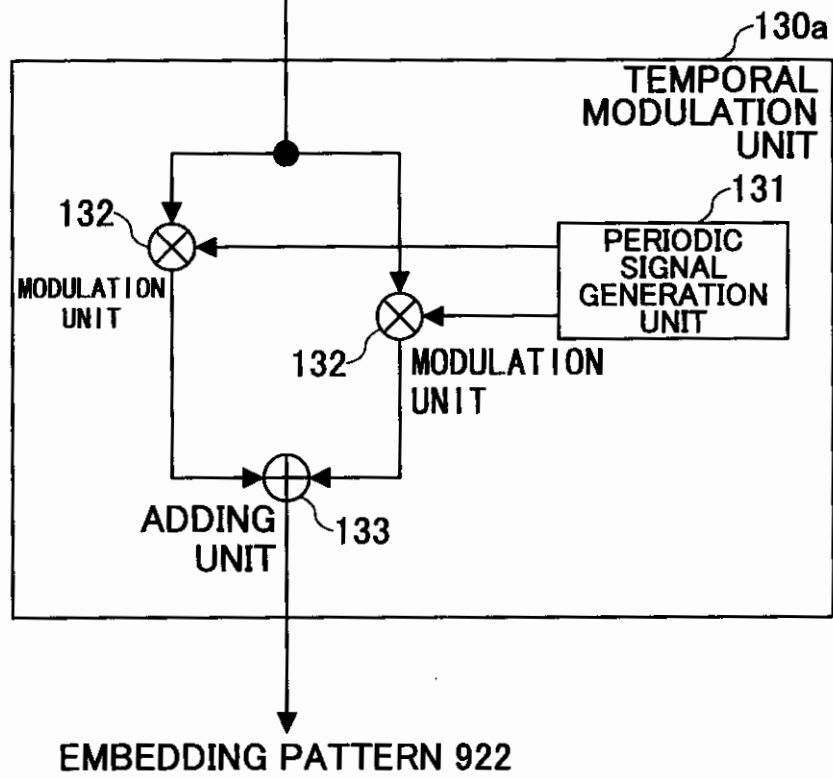


FIG.19

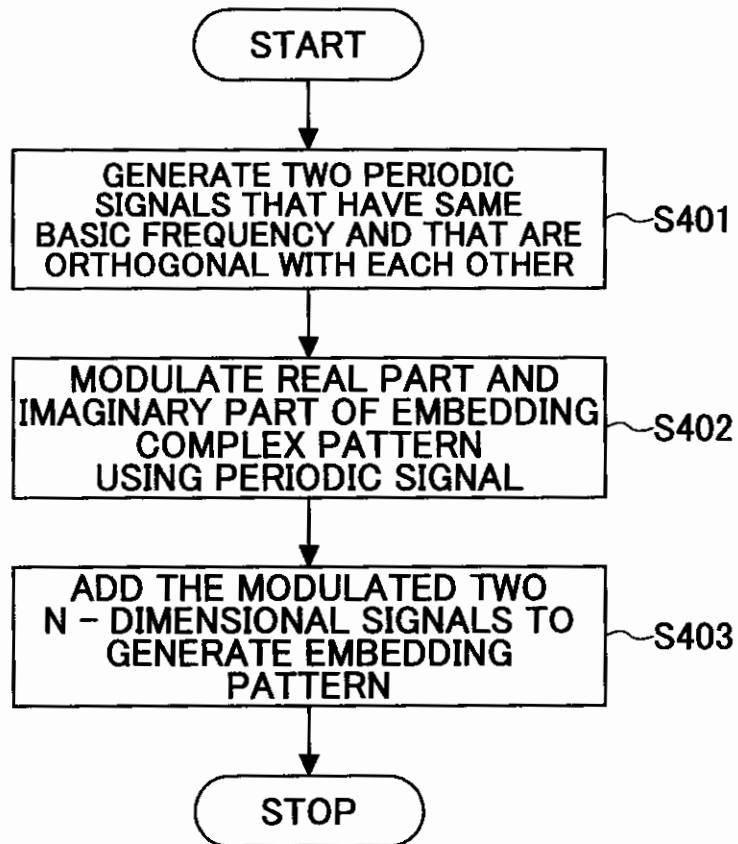


FIG.20

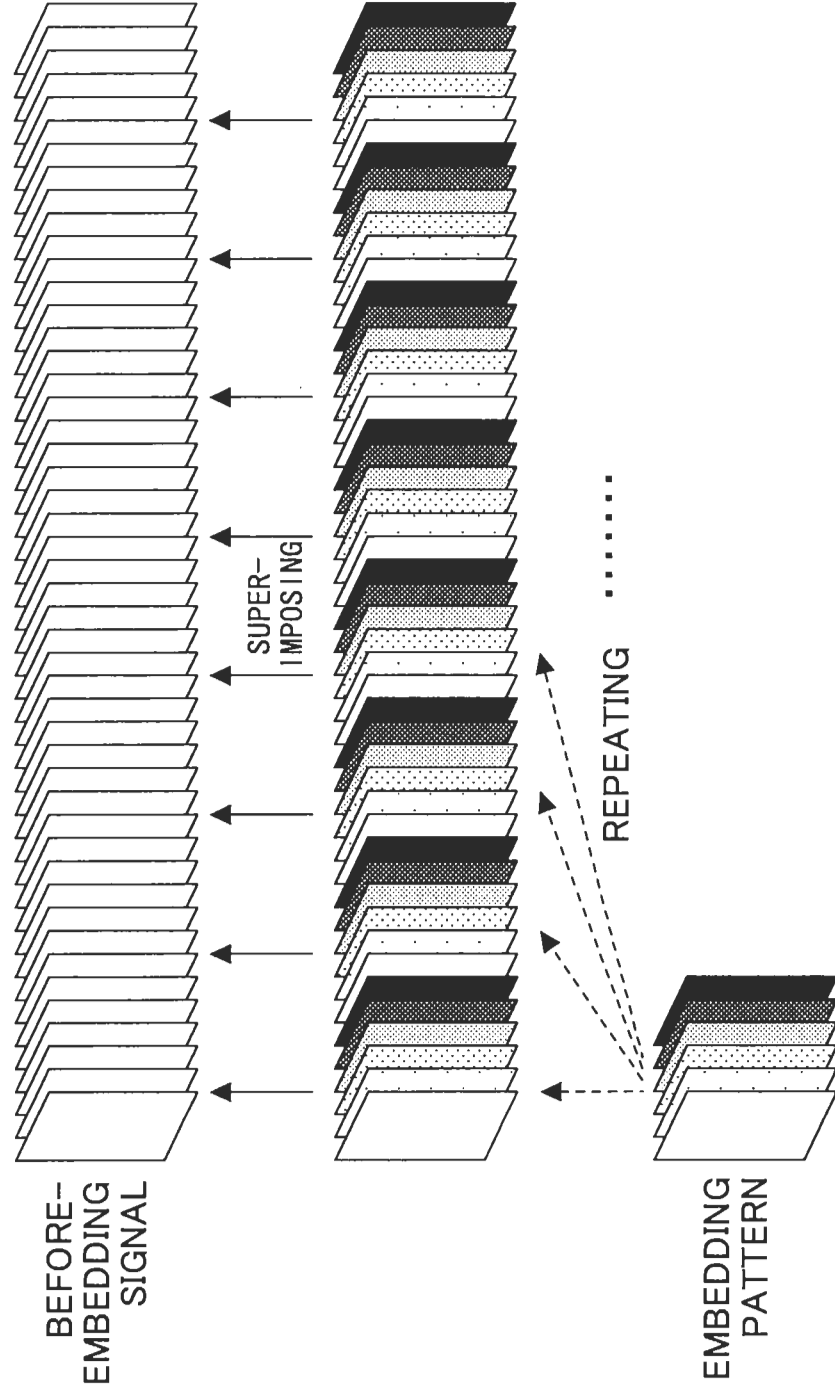
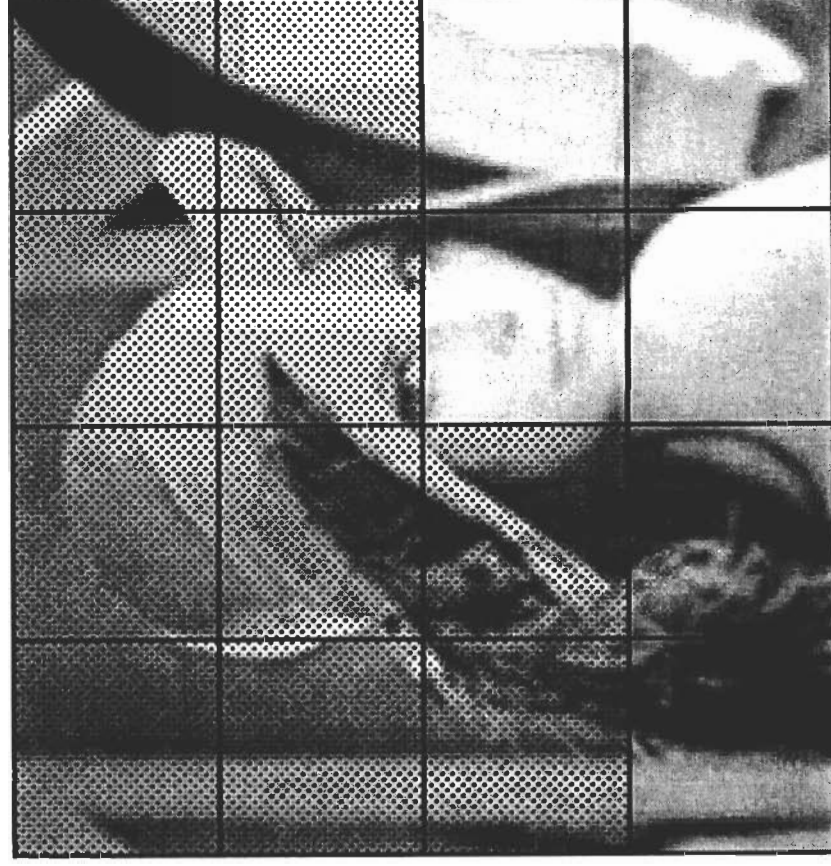
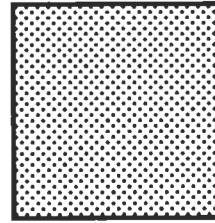


FIG.21



TILE SAME PATTERN
REPEATEDLY



EMBEDDING
PATTERN

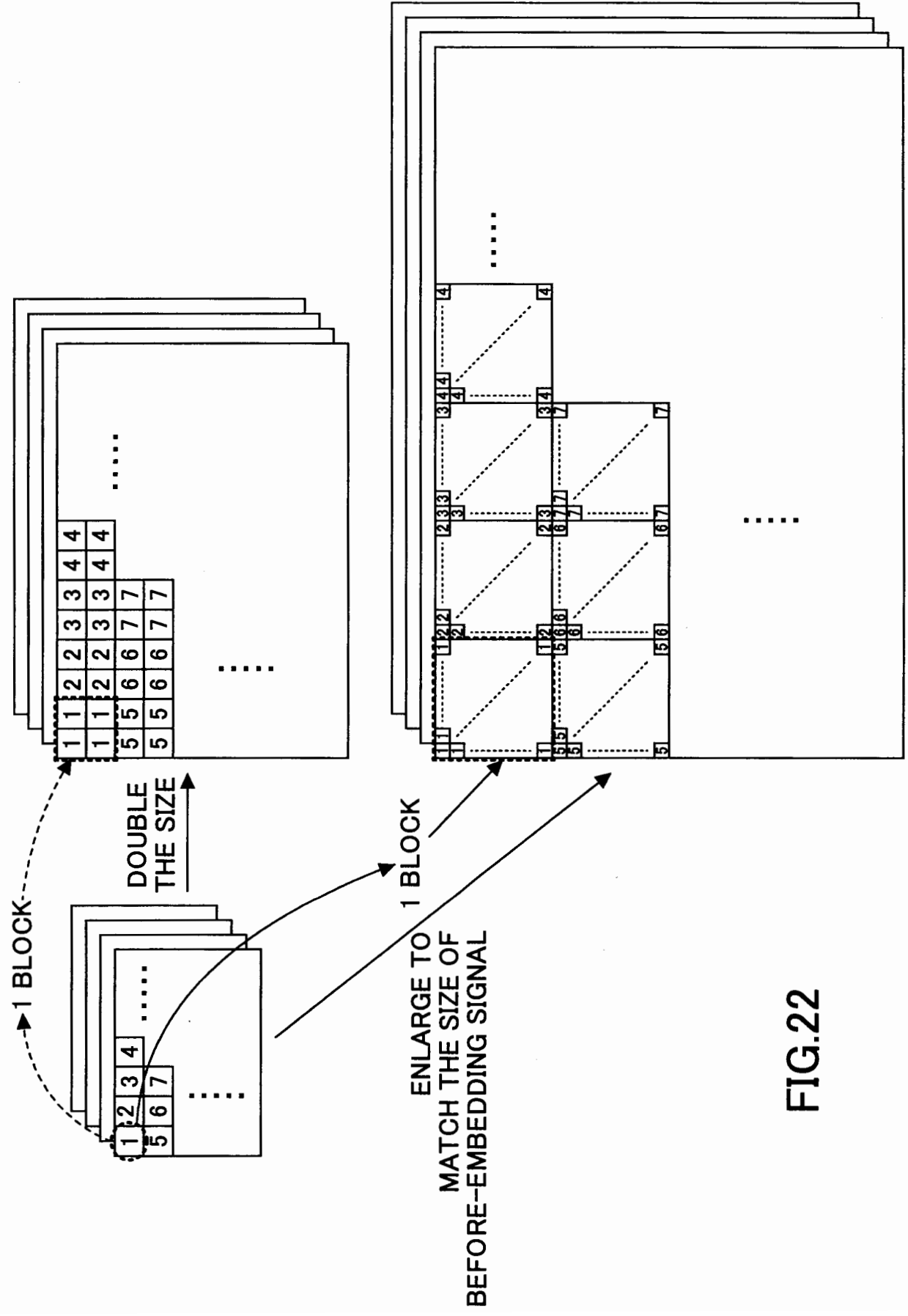


FIG.23

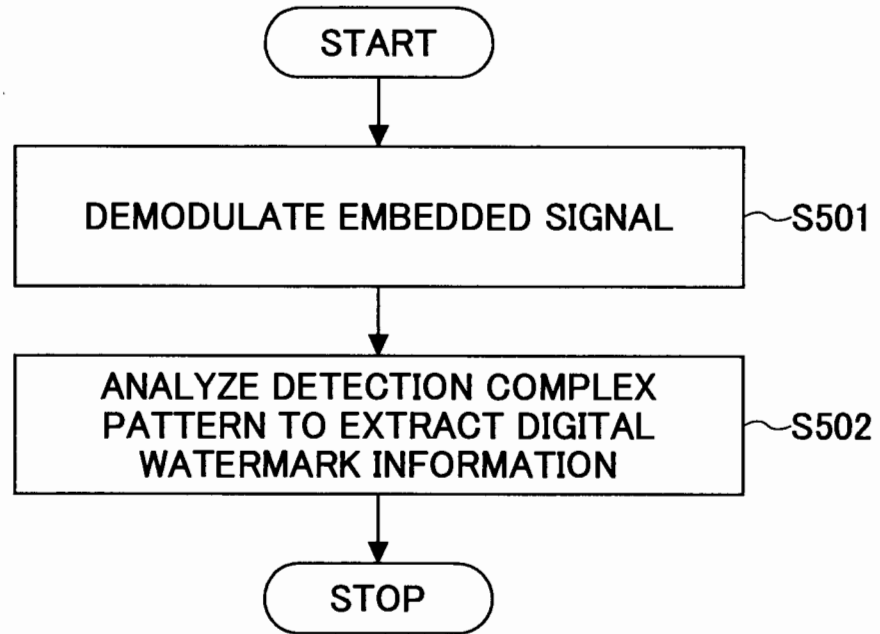


FIG.24

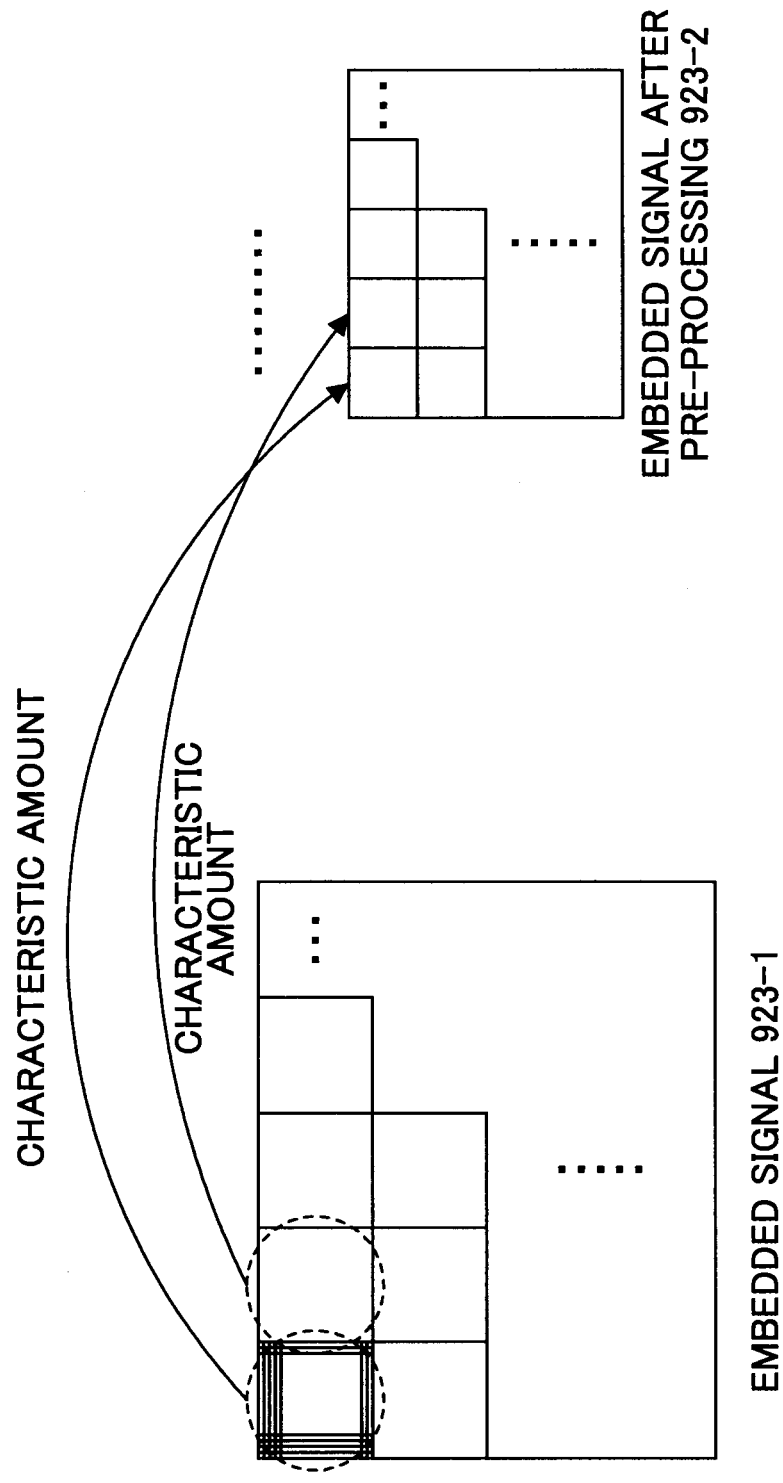


FIG.25

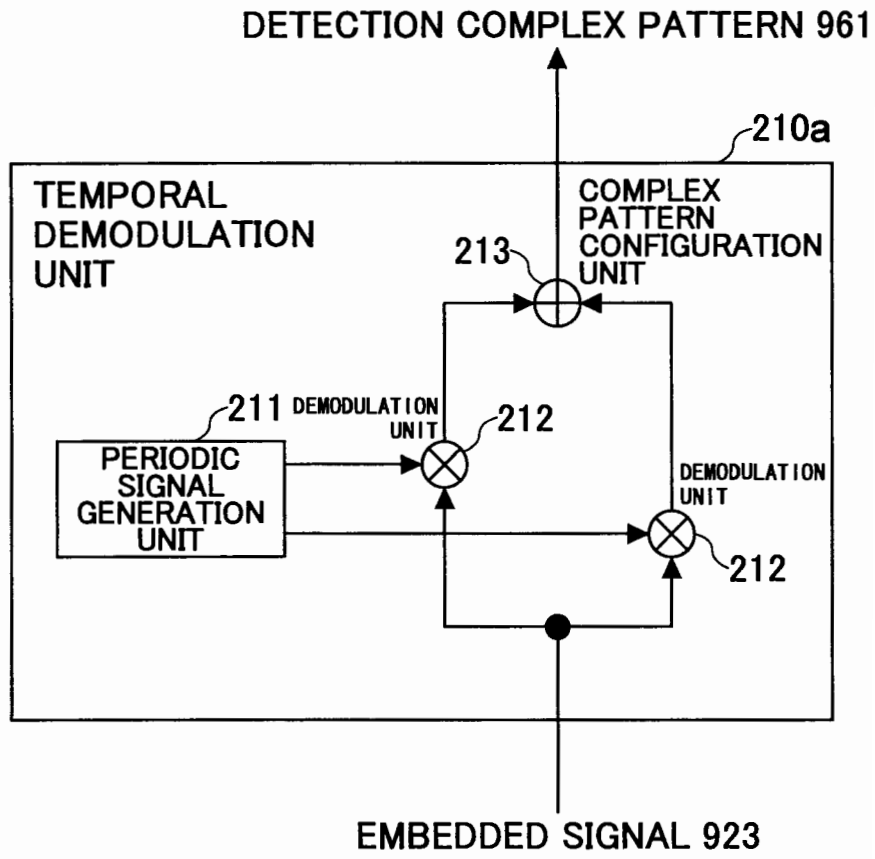


FIG.26

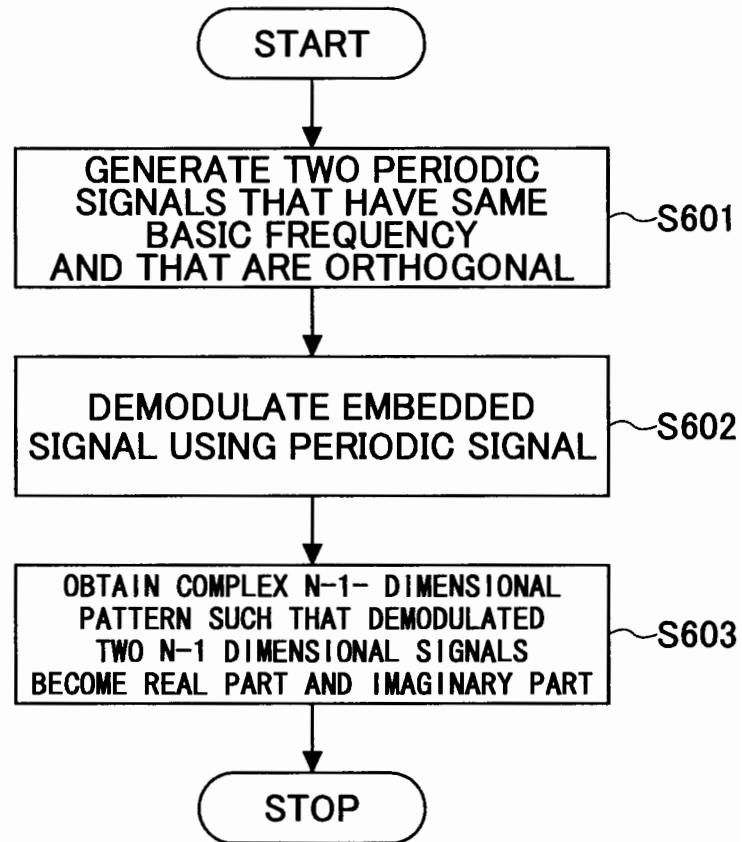


FIG.27

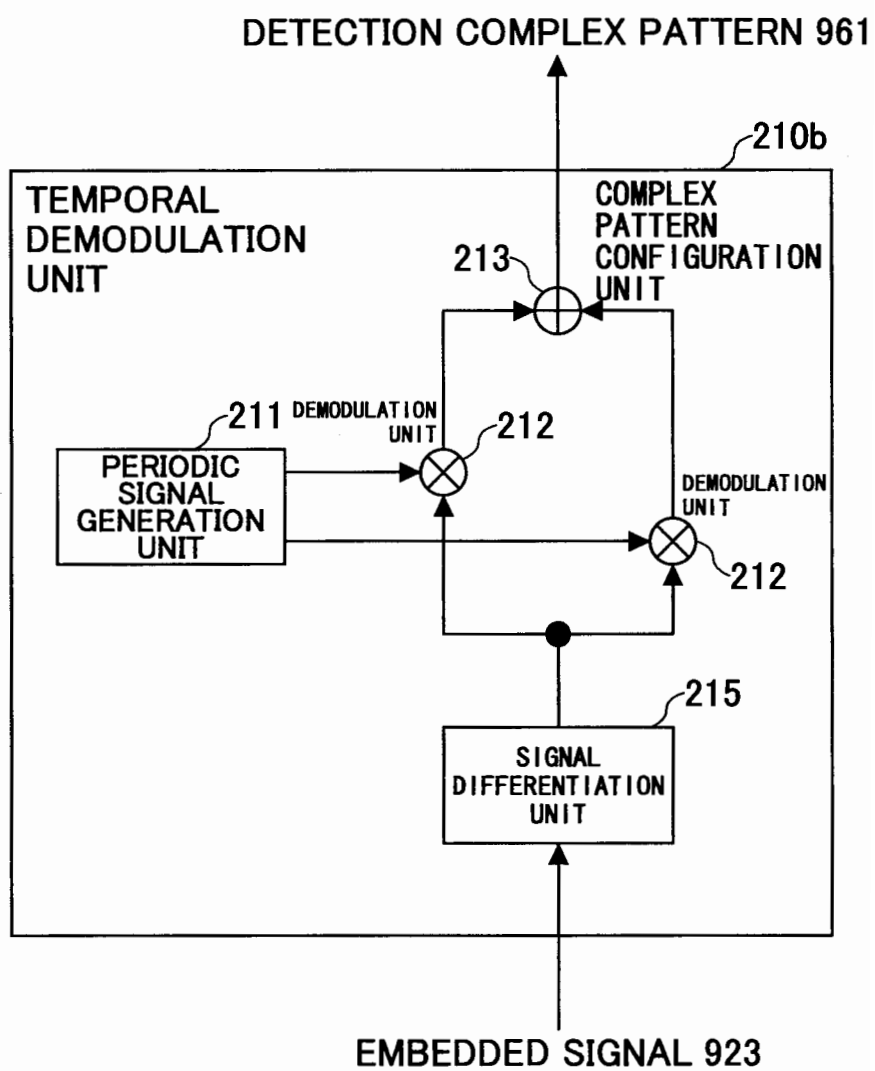


FIG.28

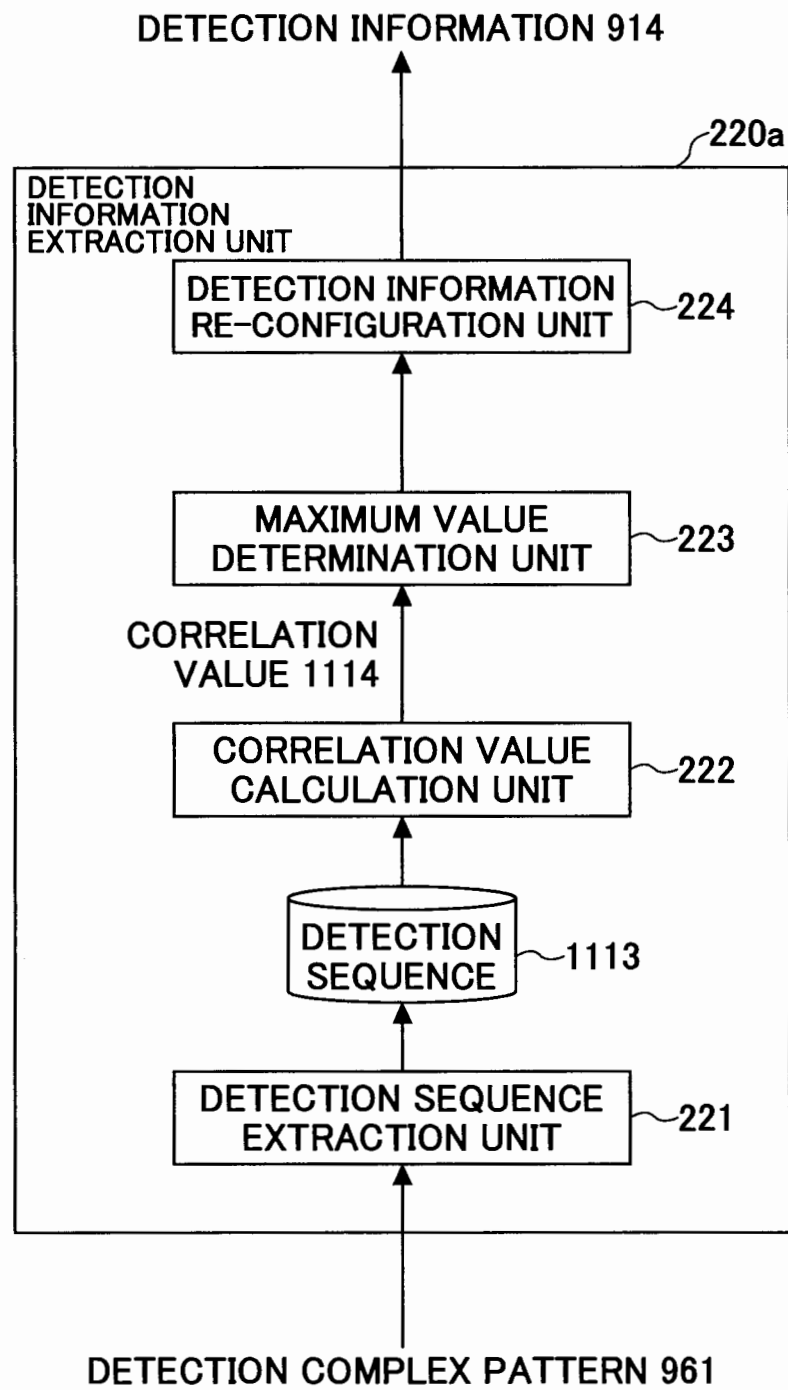


FIG.29

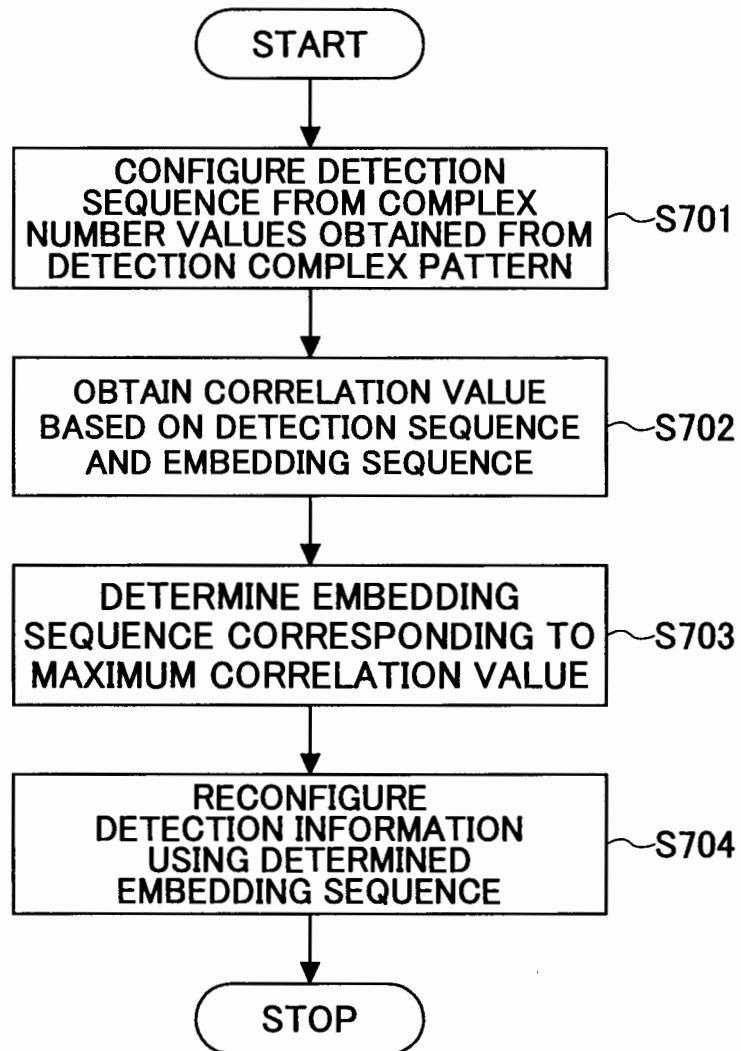


FIG.30

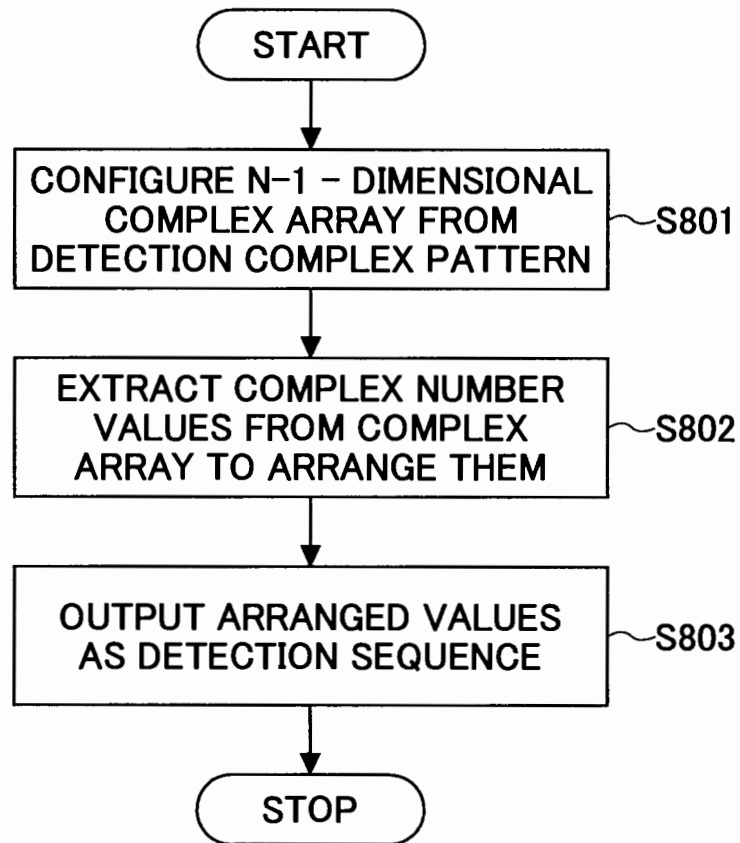


FIG.31

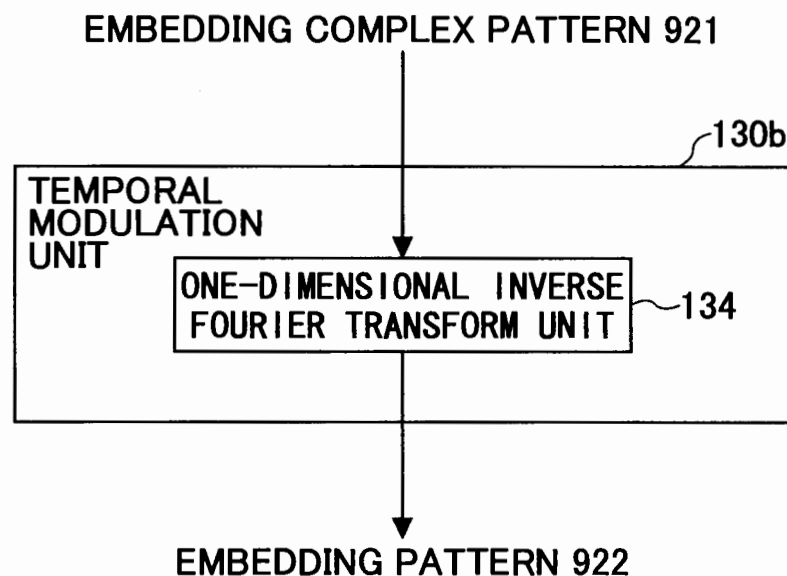


FIG.32

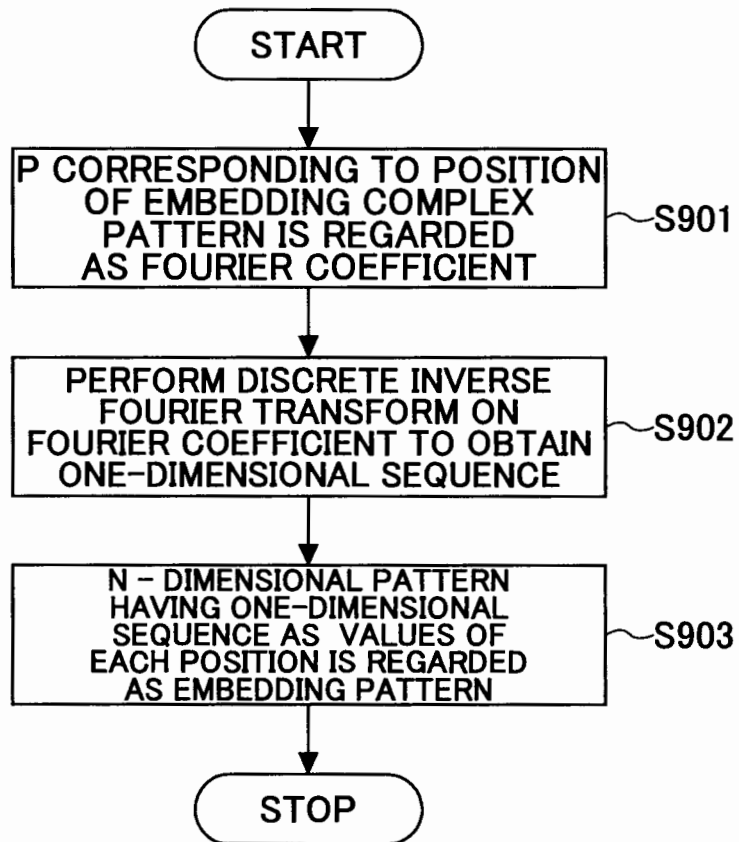


FIG.33

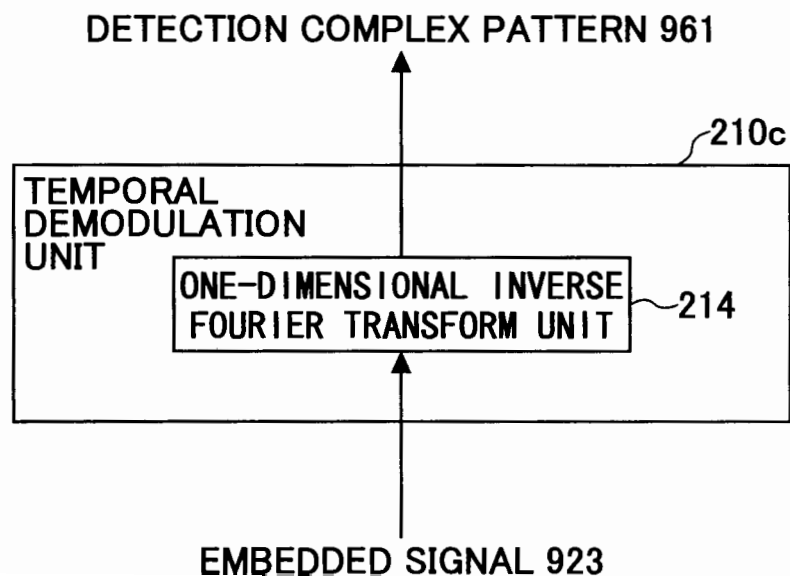


FIG.34

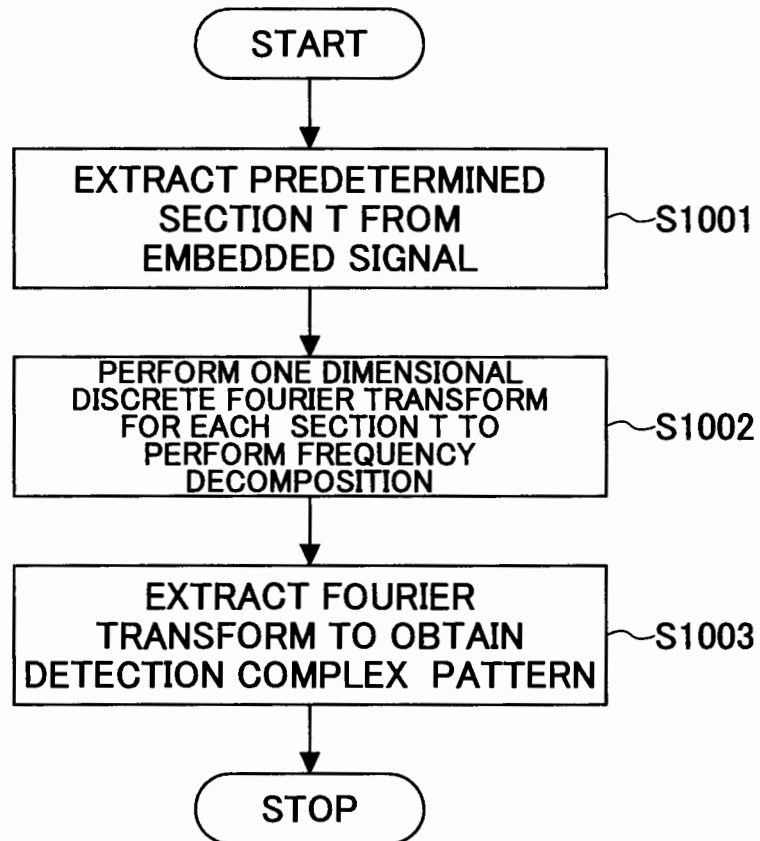


FIG.35

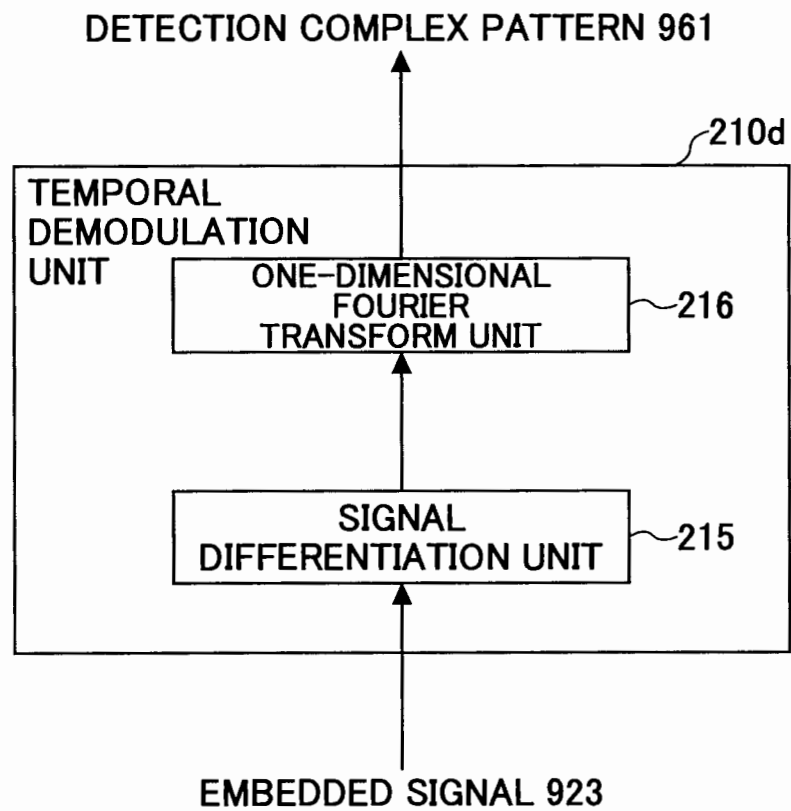


FIG.36

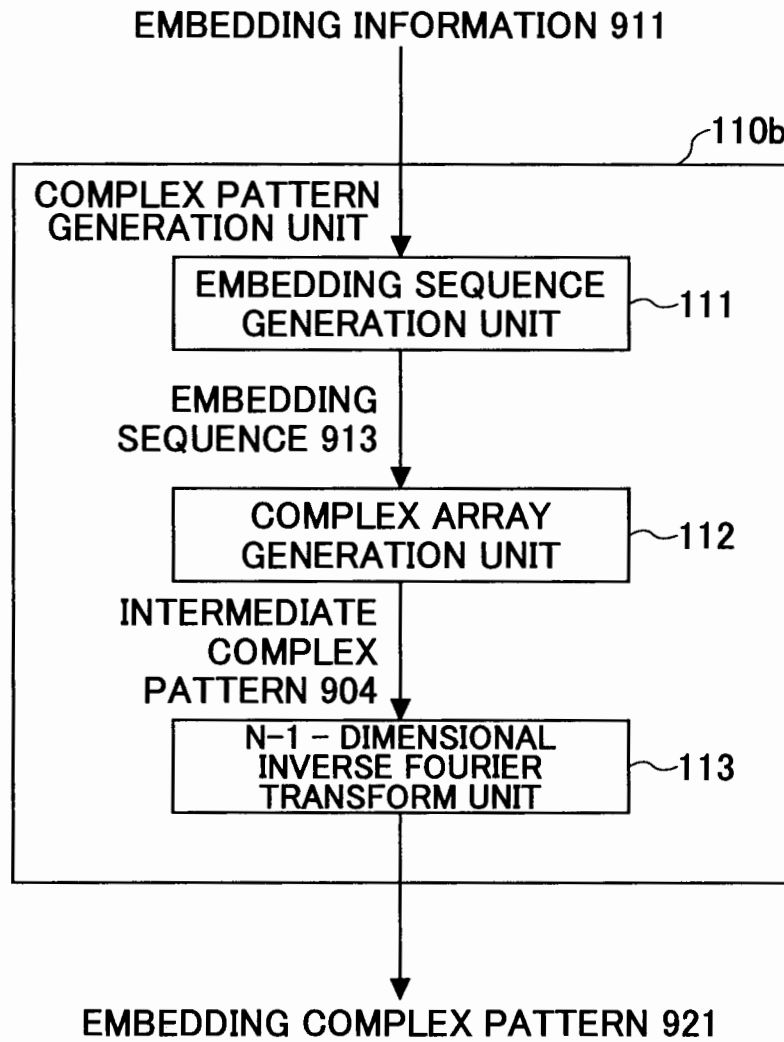


FIG.37

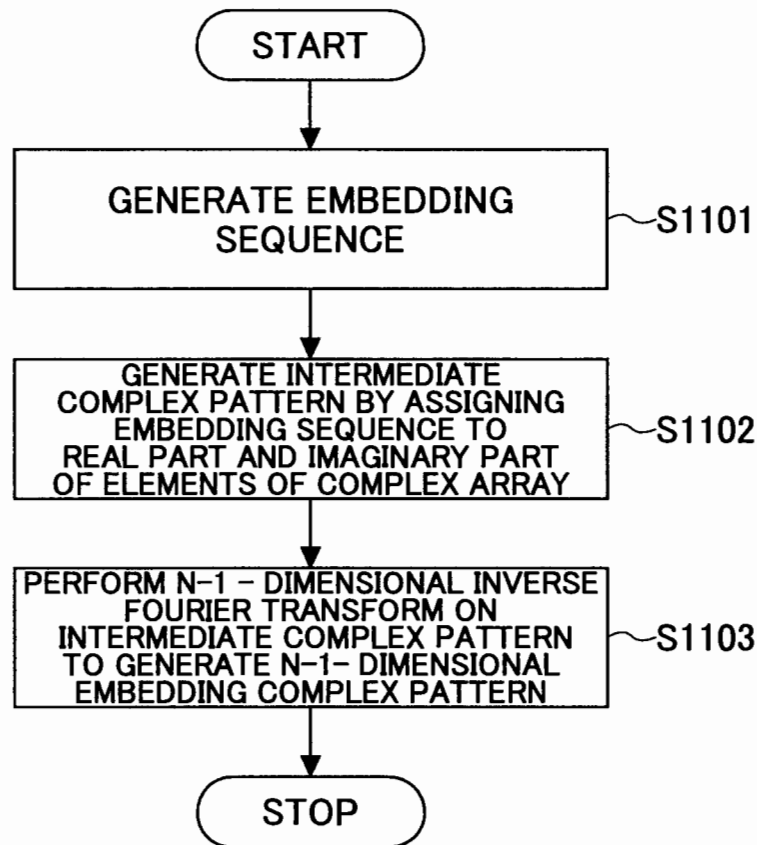


FIG.38A

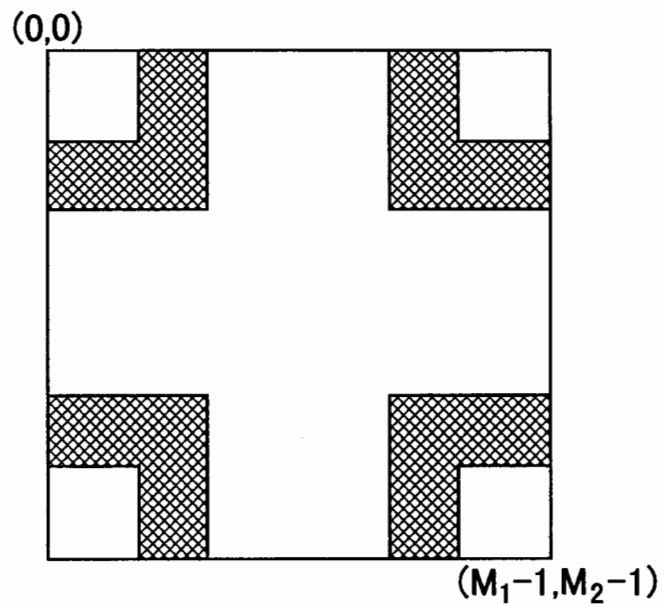


FIG.38B

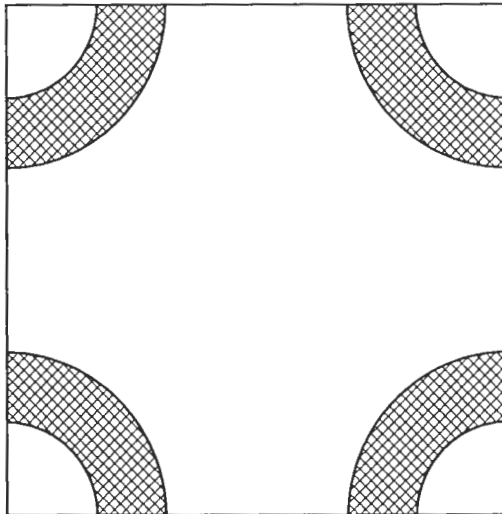


FIG.38C

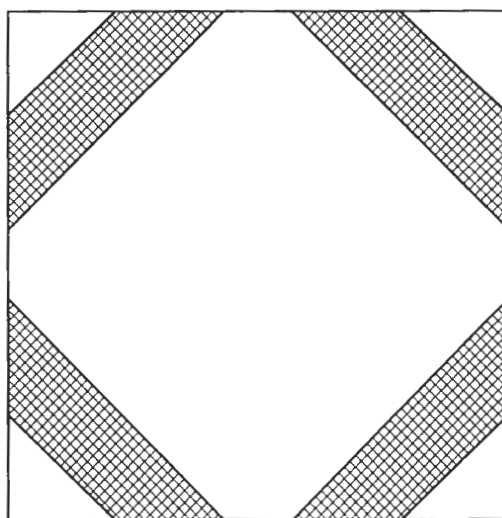


FIG.38D

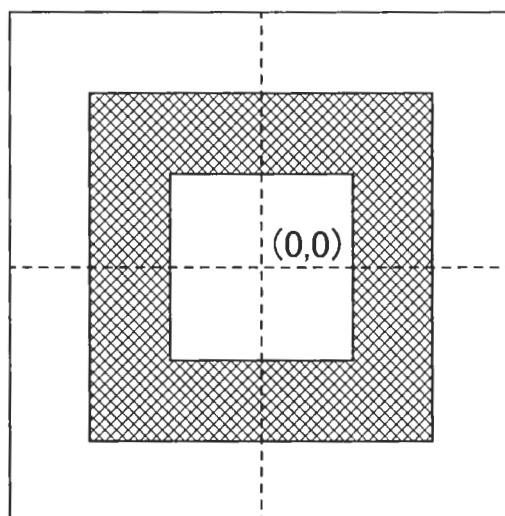


FIG.38E

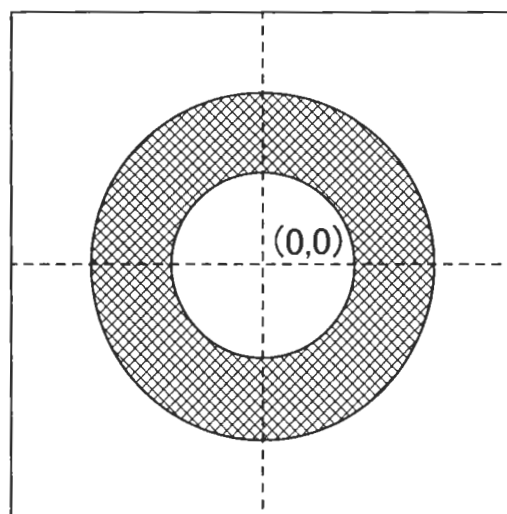


FIG.38F

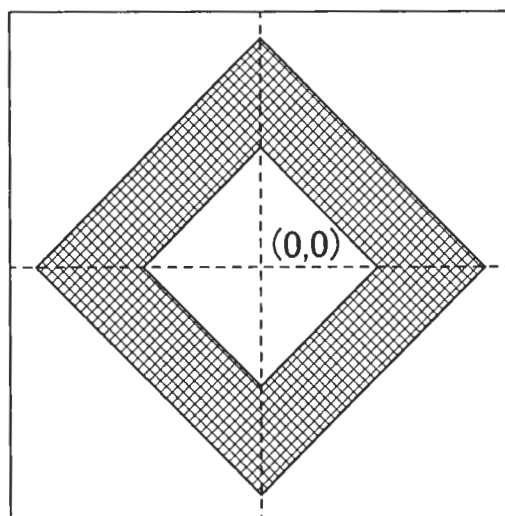


FIG.39A

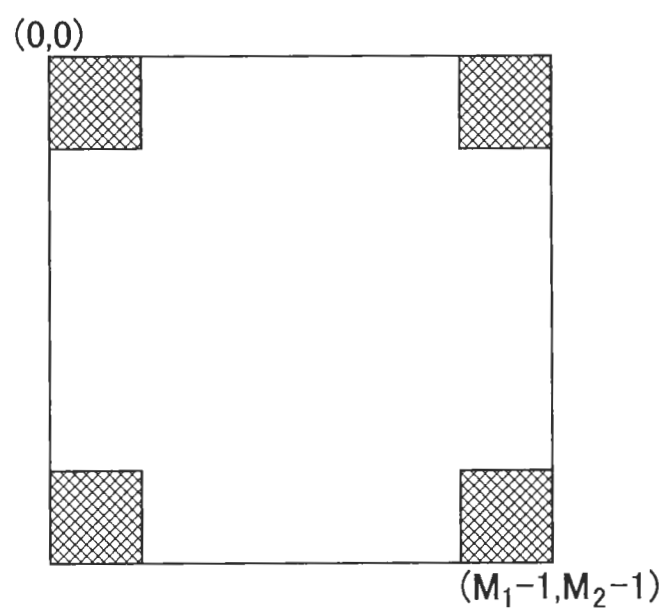


FIG.39B

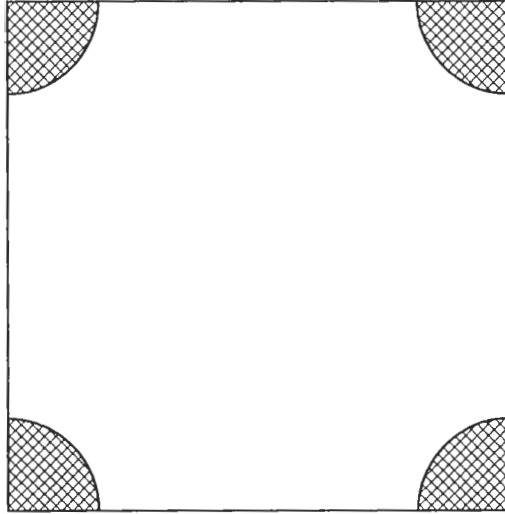


FIG.39C

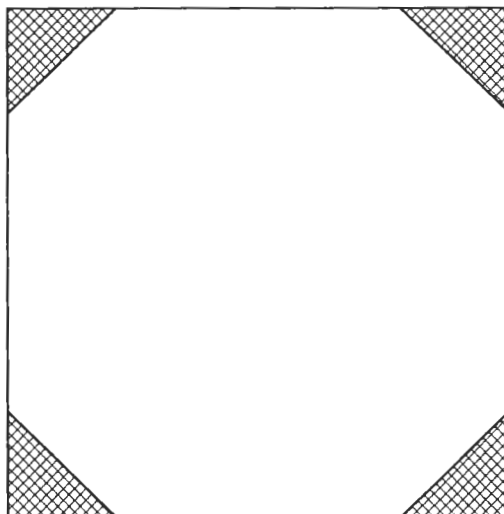


FIG.39D

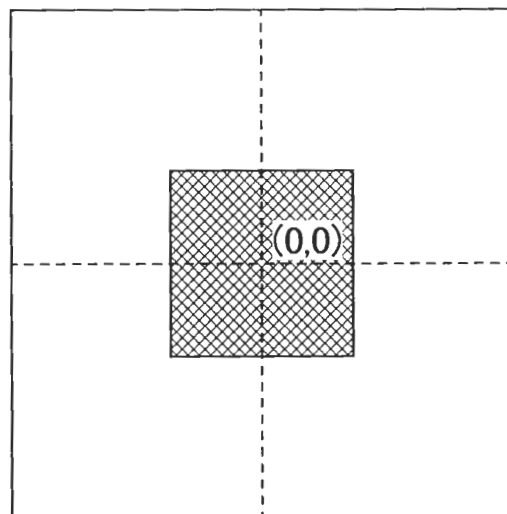


FIG.39E

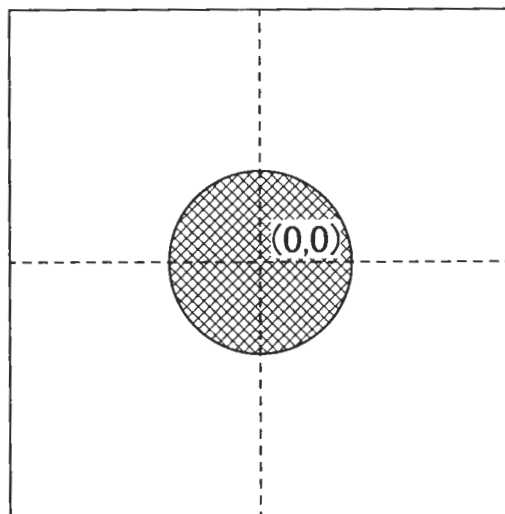


FIG.39F

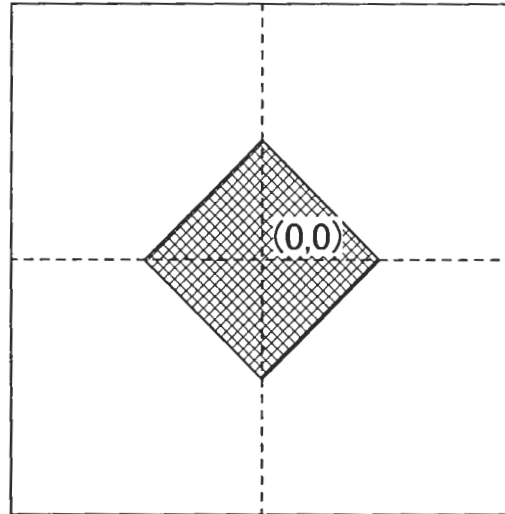


FIG.40

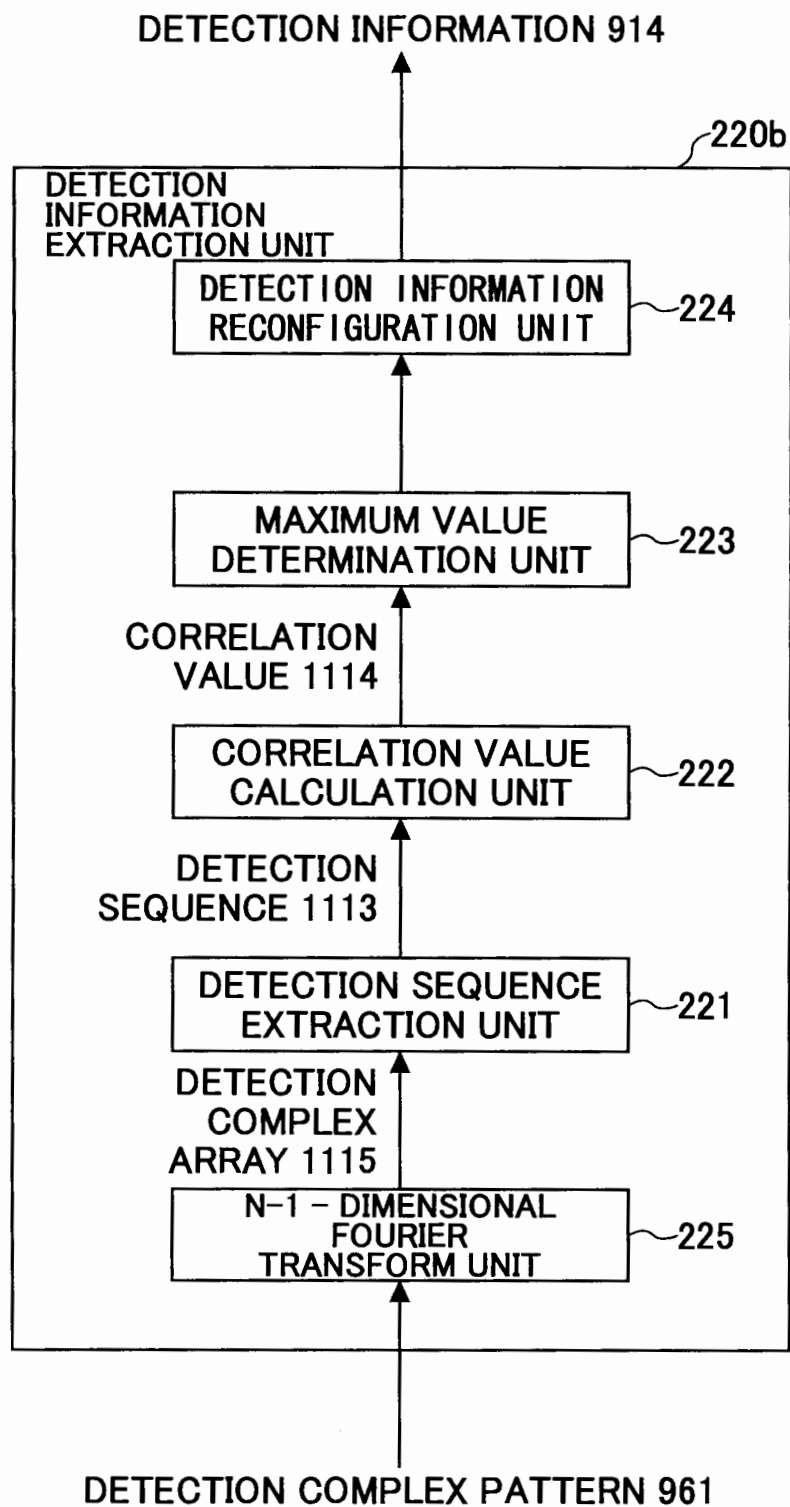


FIG.41

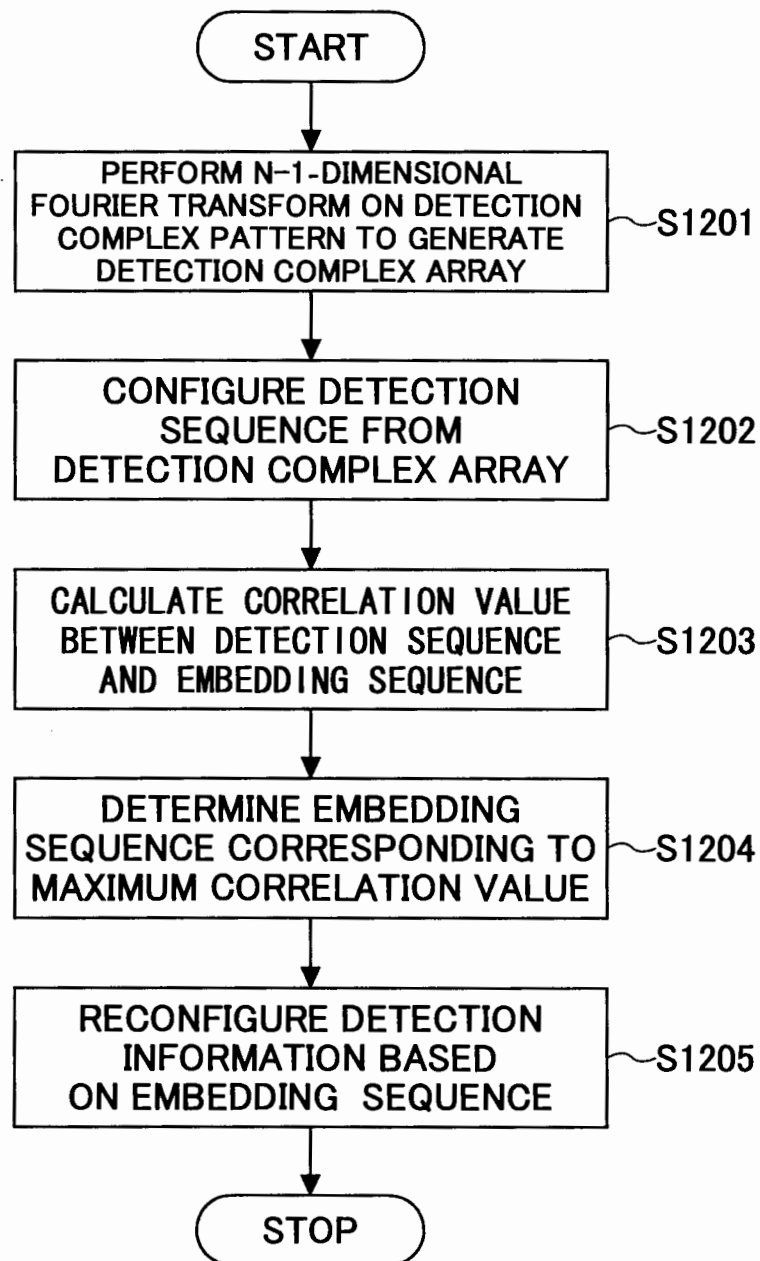


FIG.42

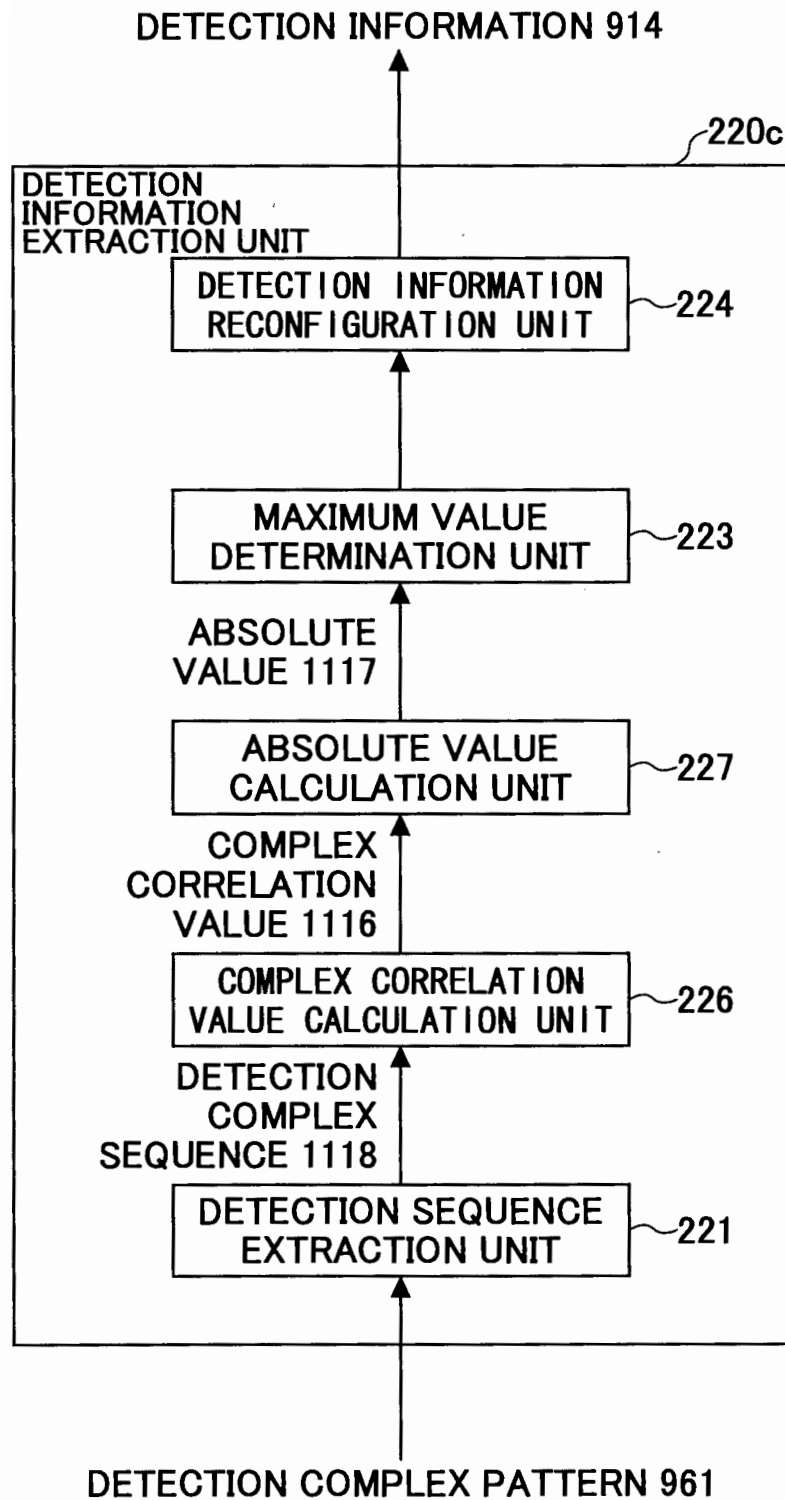


FIG.43

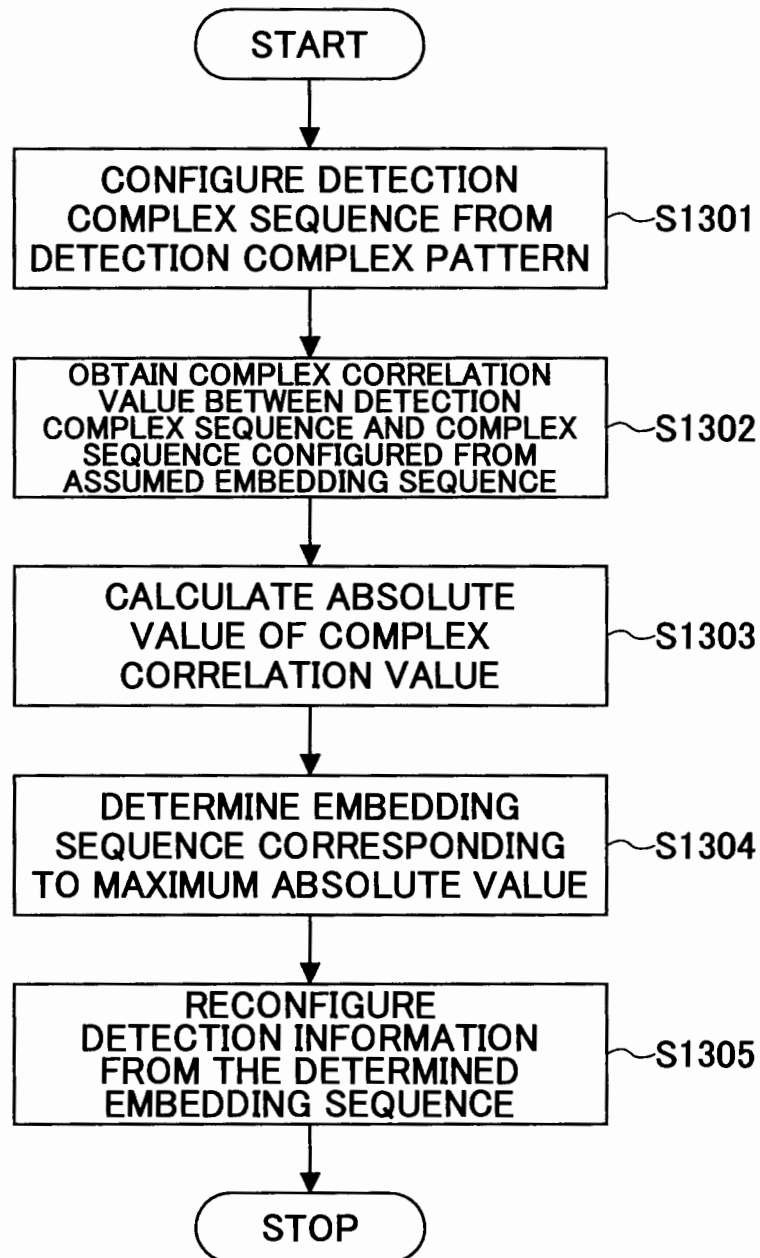


FIG.44

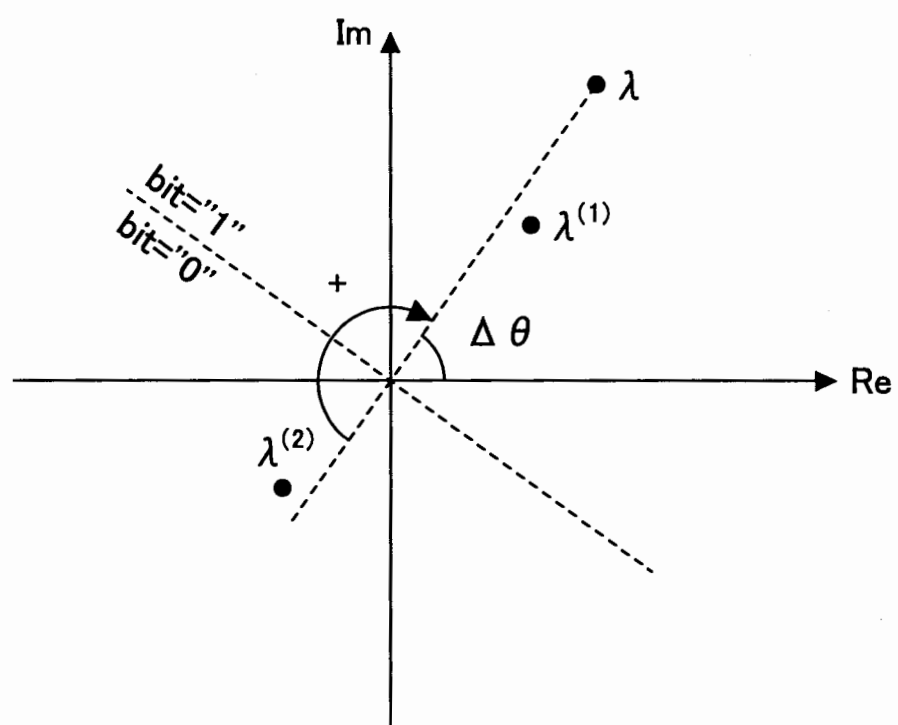


FIG.45

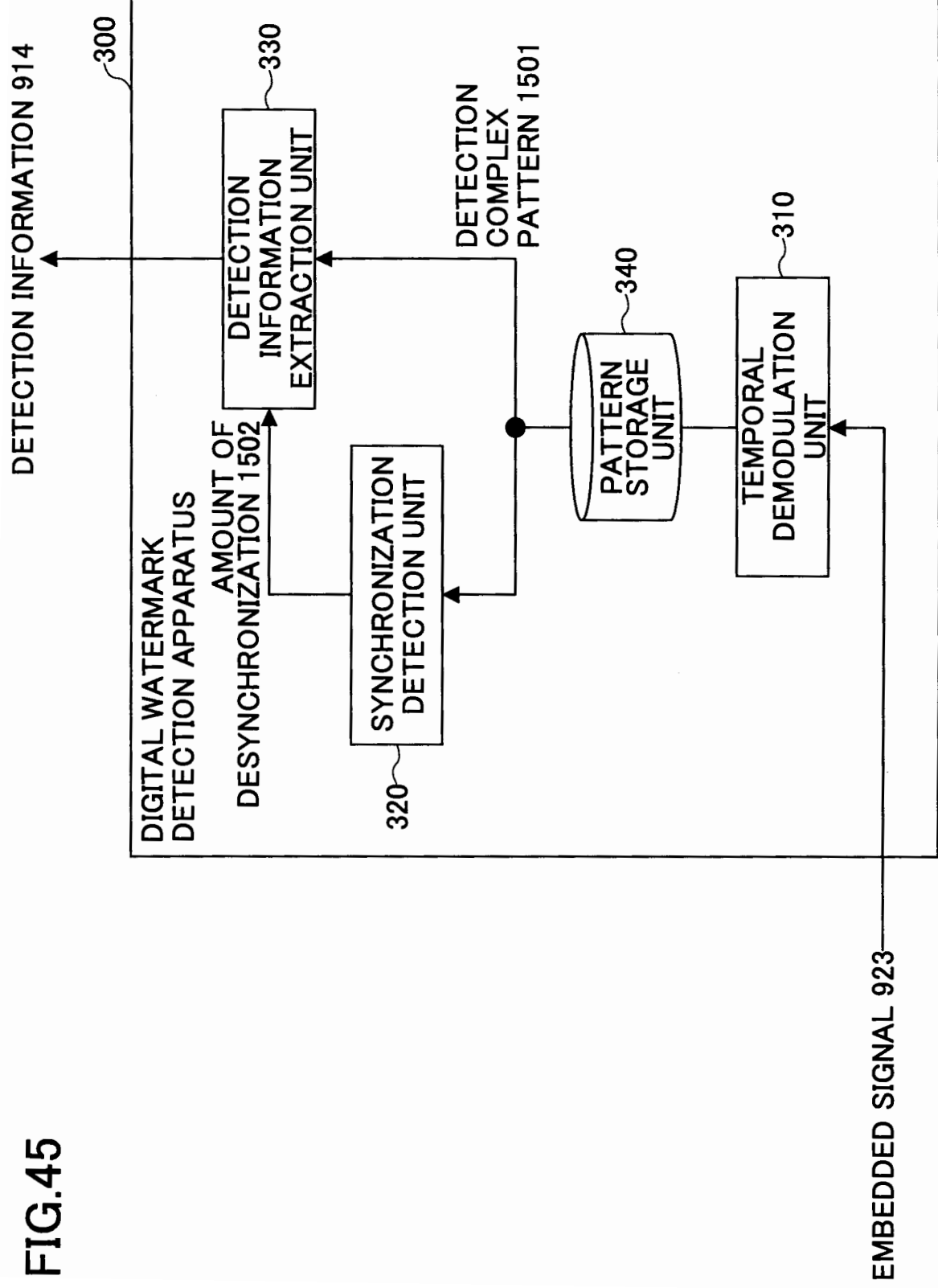


FIG.46

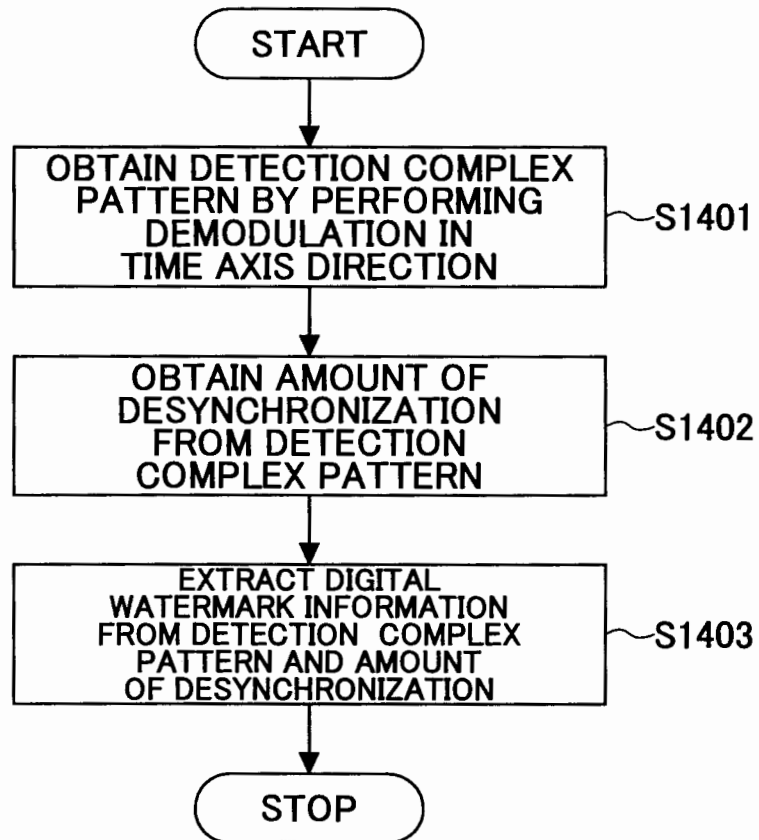


FIG.47

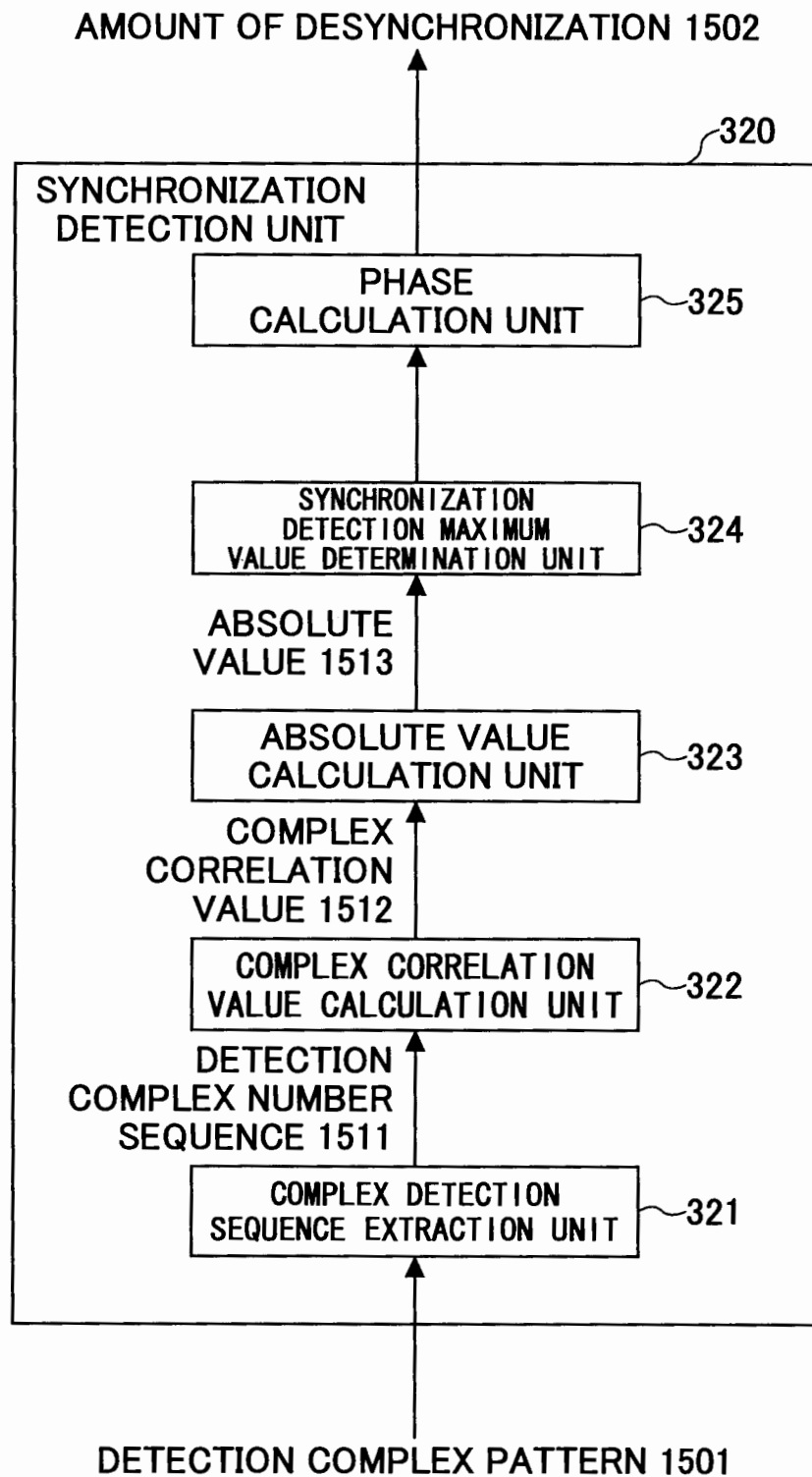


FIG.48

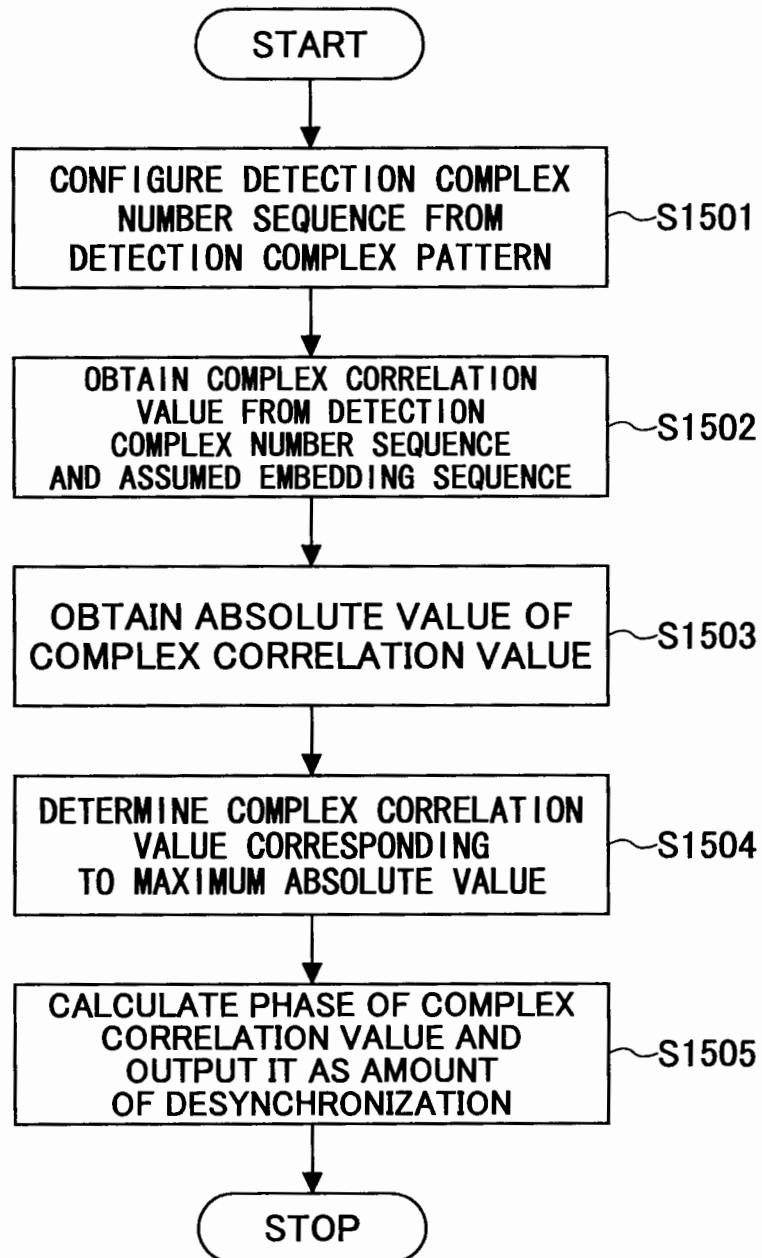


FIG.49

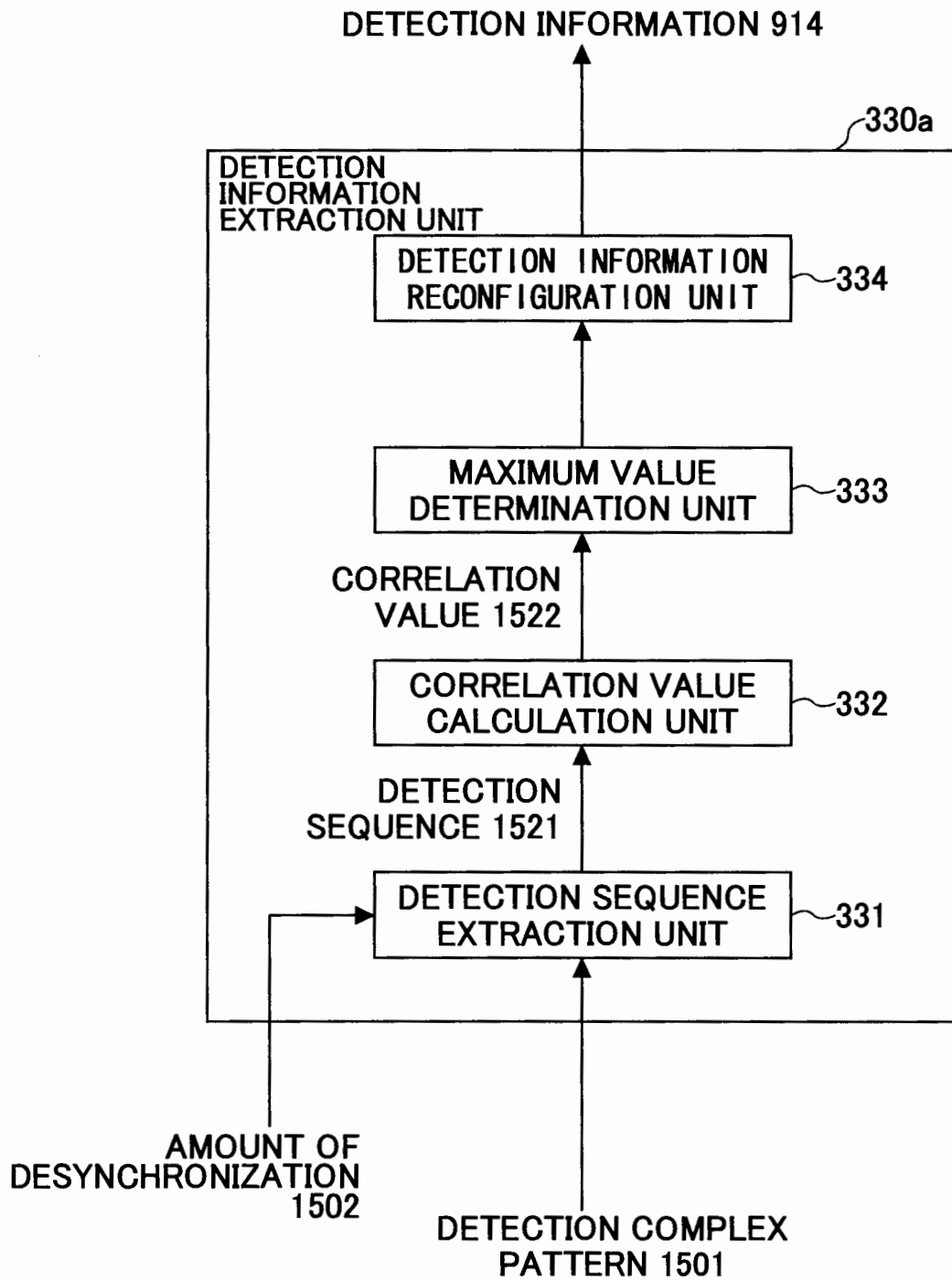


FIG.50

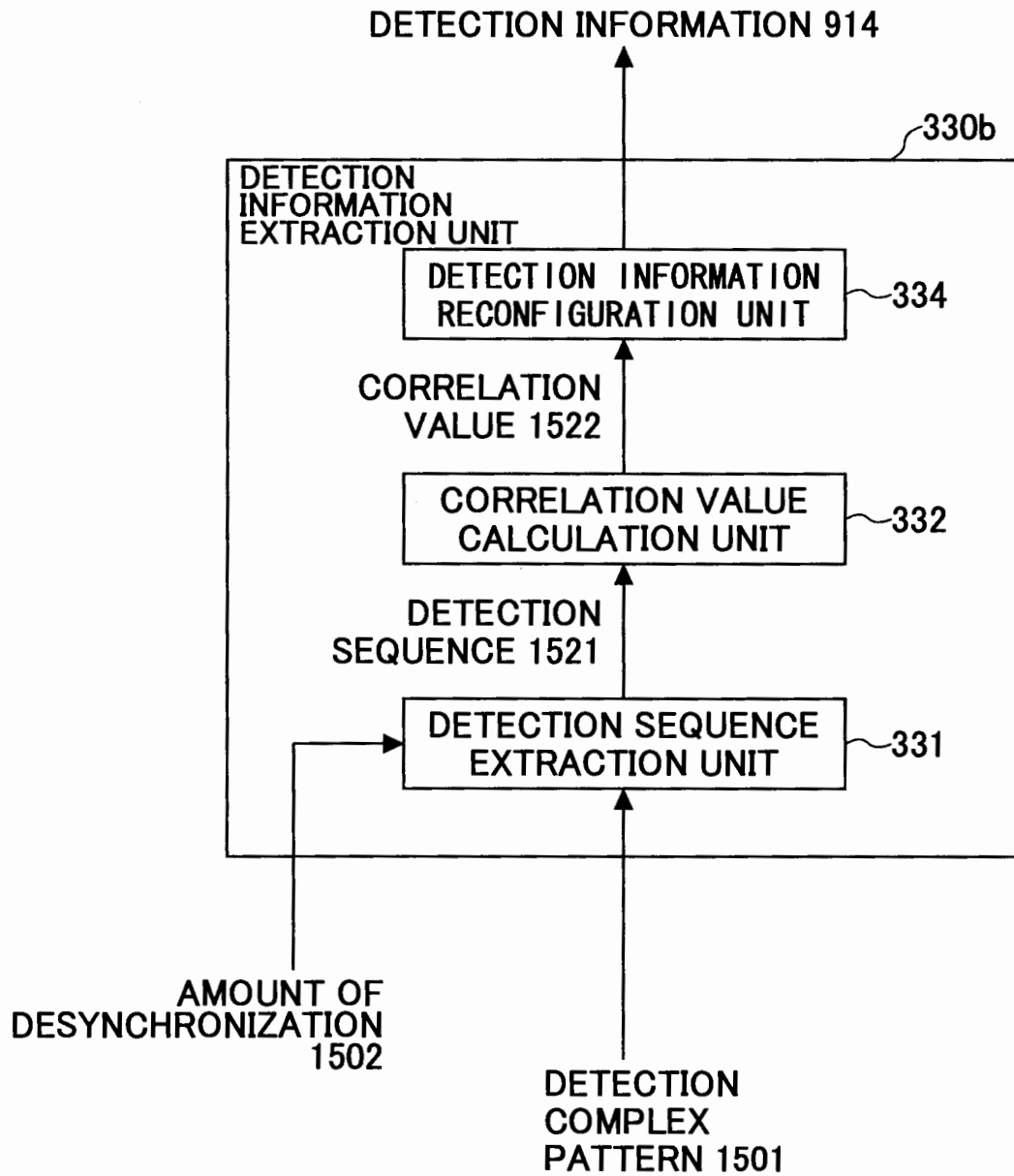


FIG.51

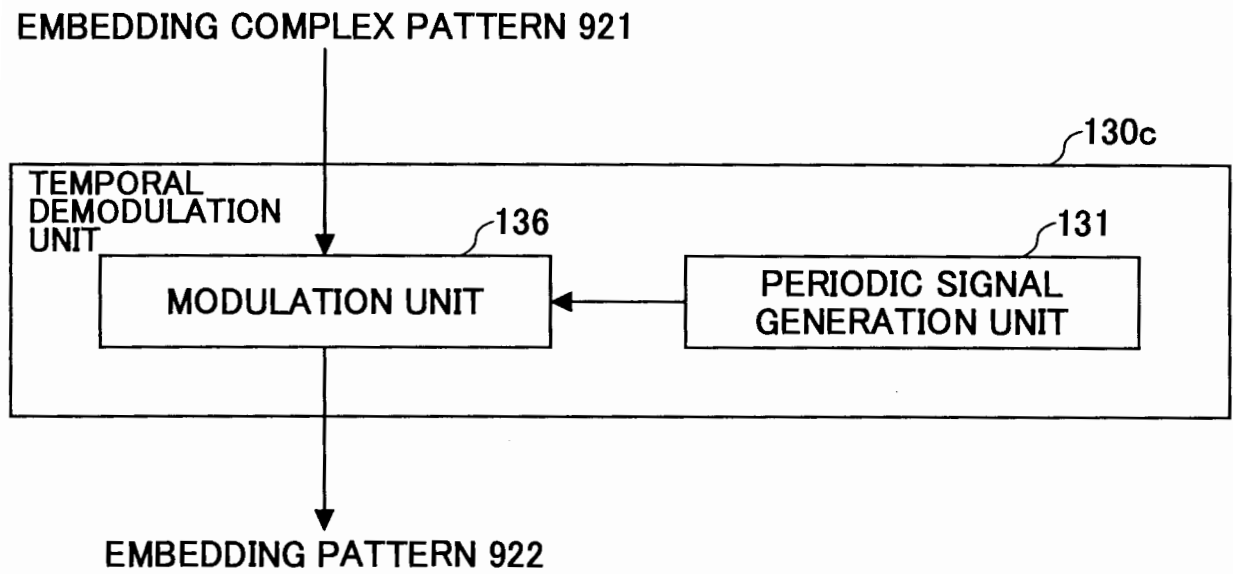


FIG.52

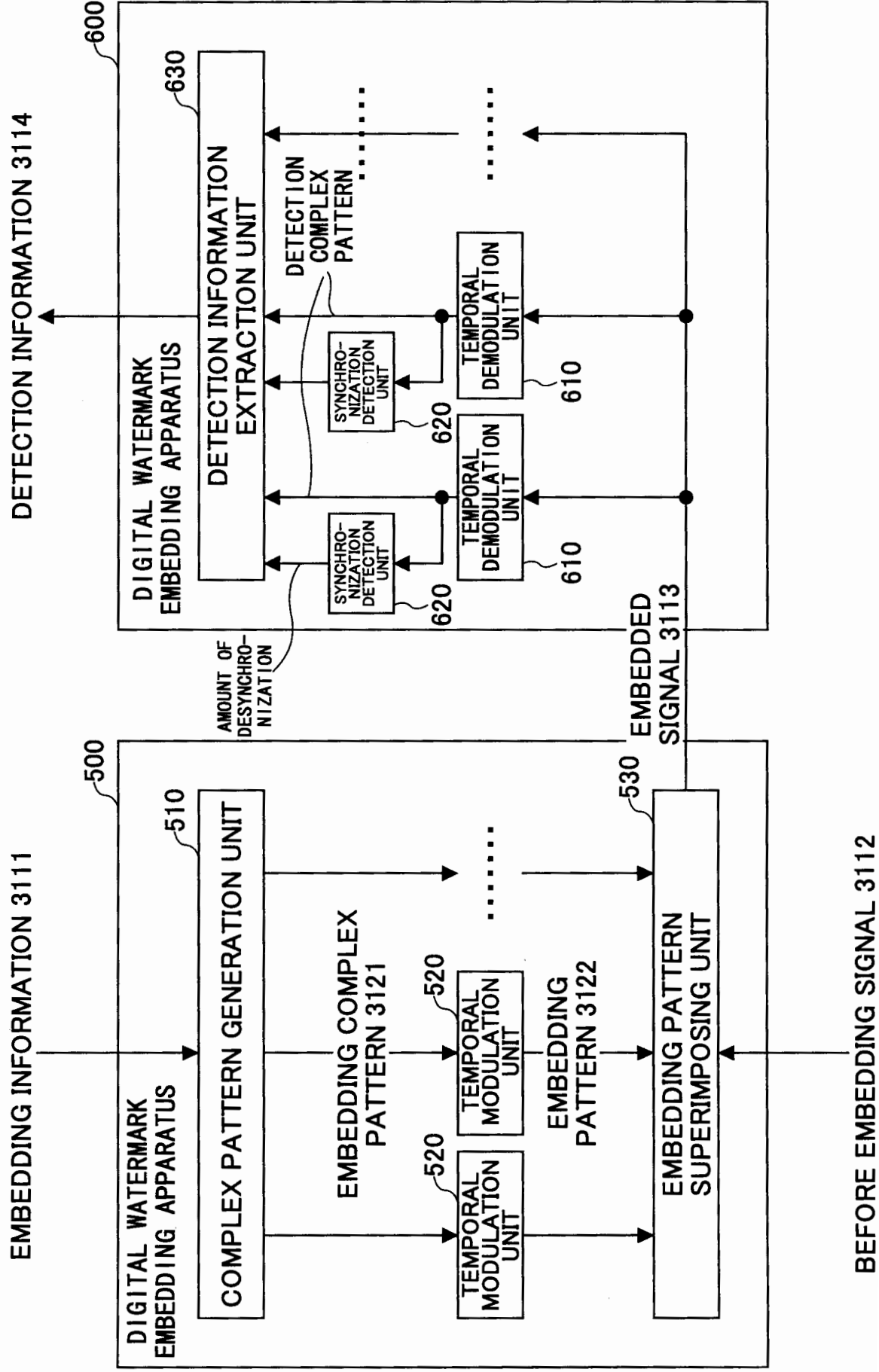


FIG.53

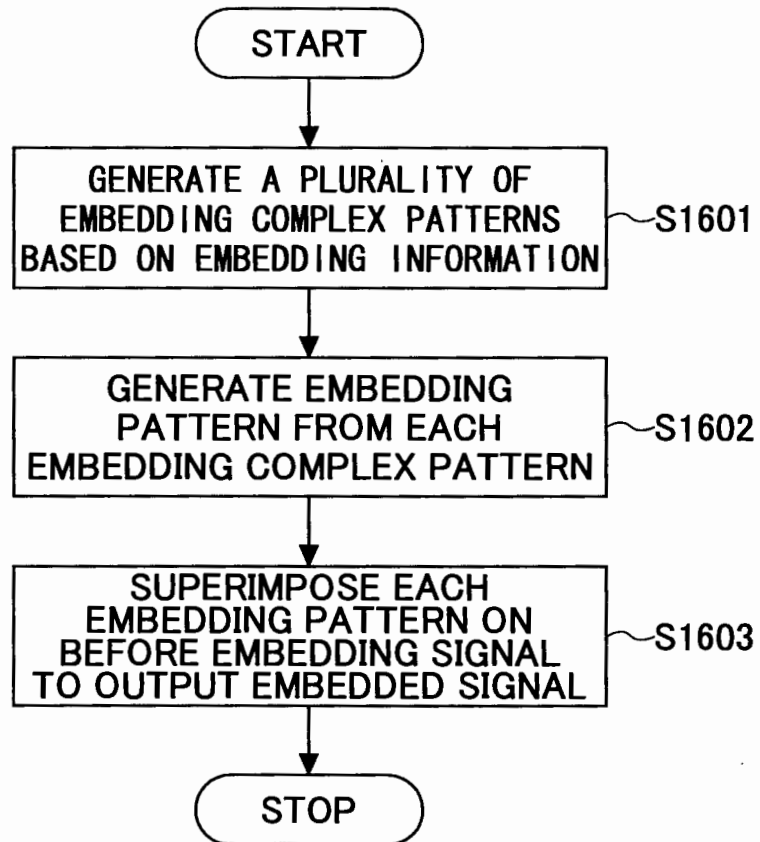


FIG.54

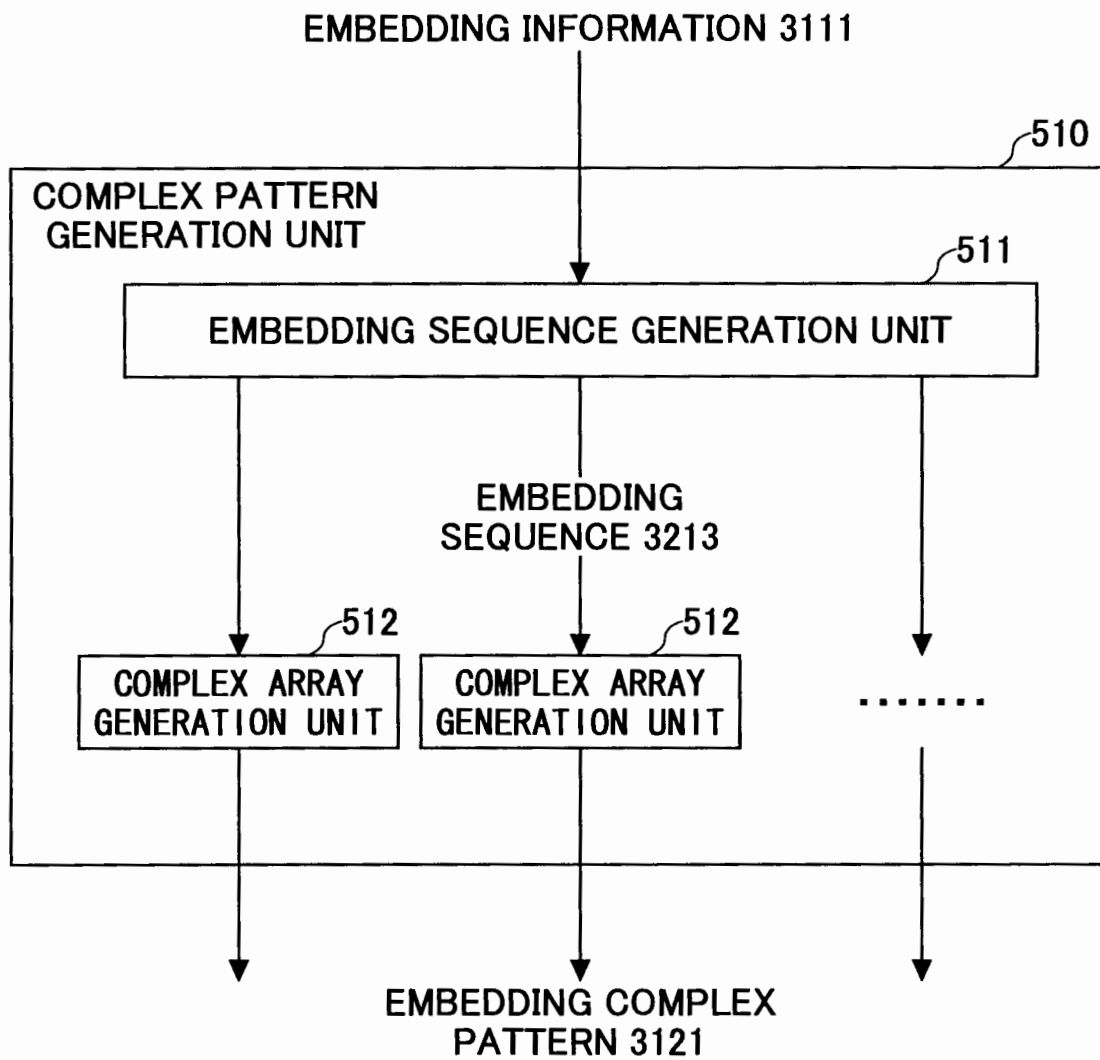


FIG.55

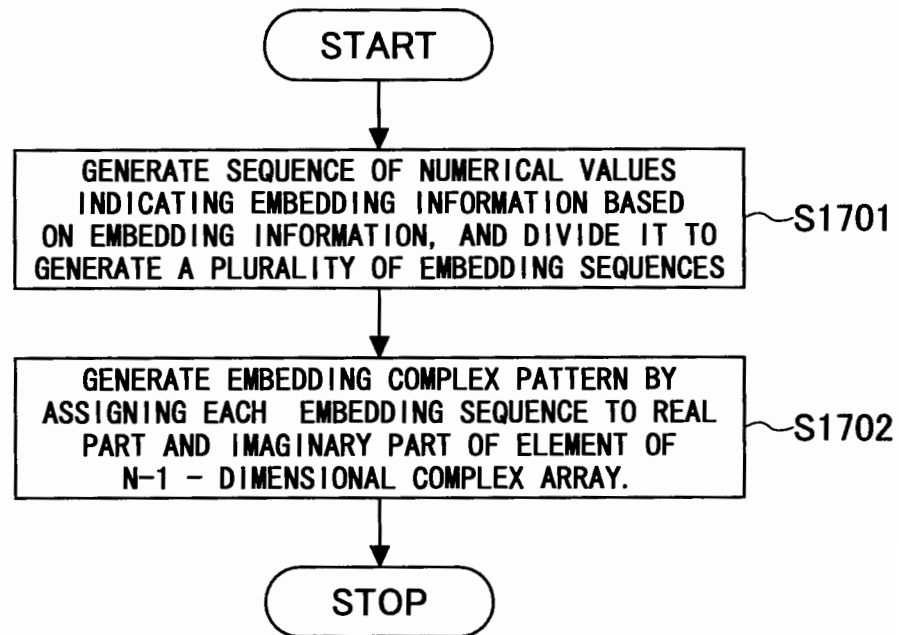


FIG.56

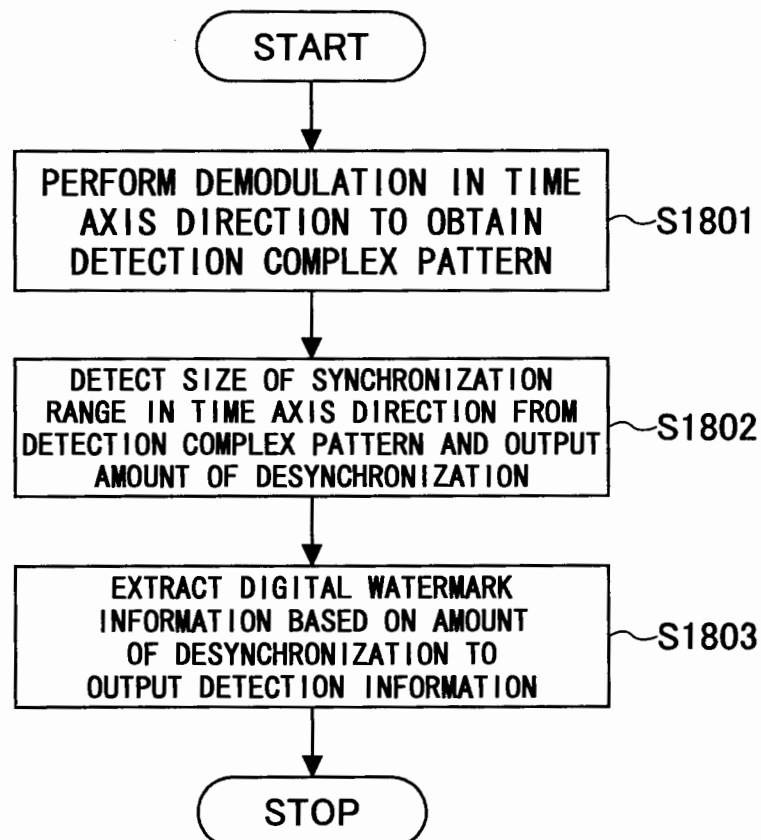


FIG.57

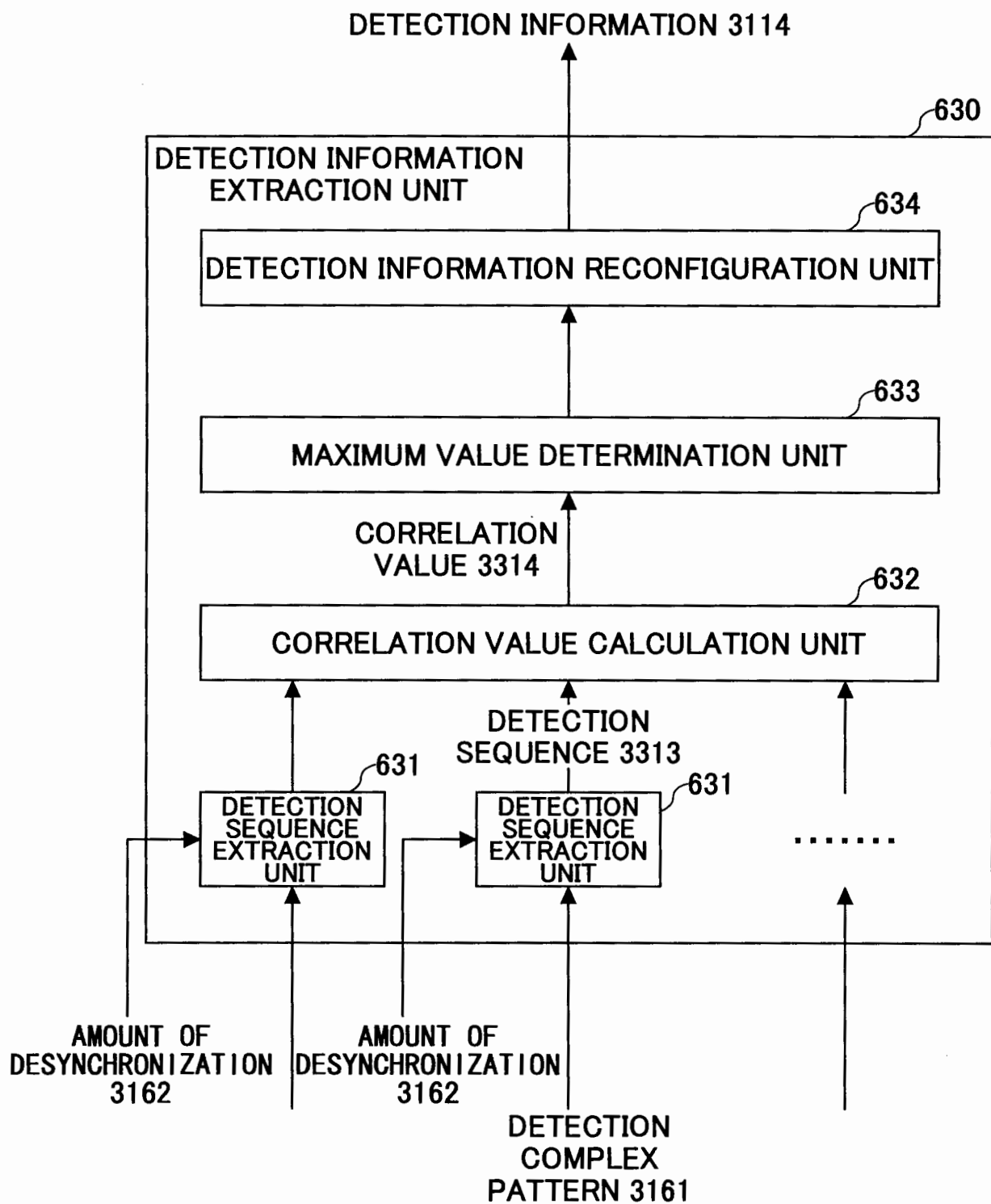


FIG.58

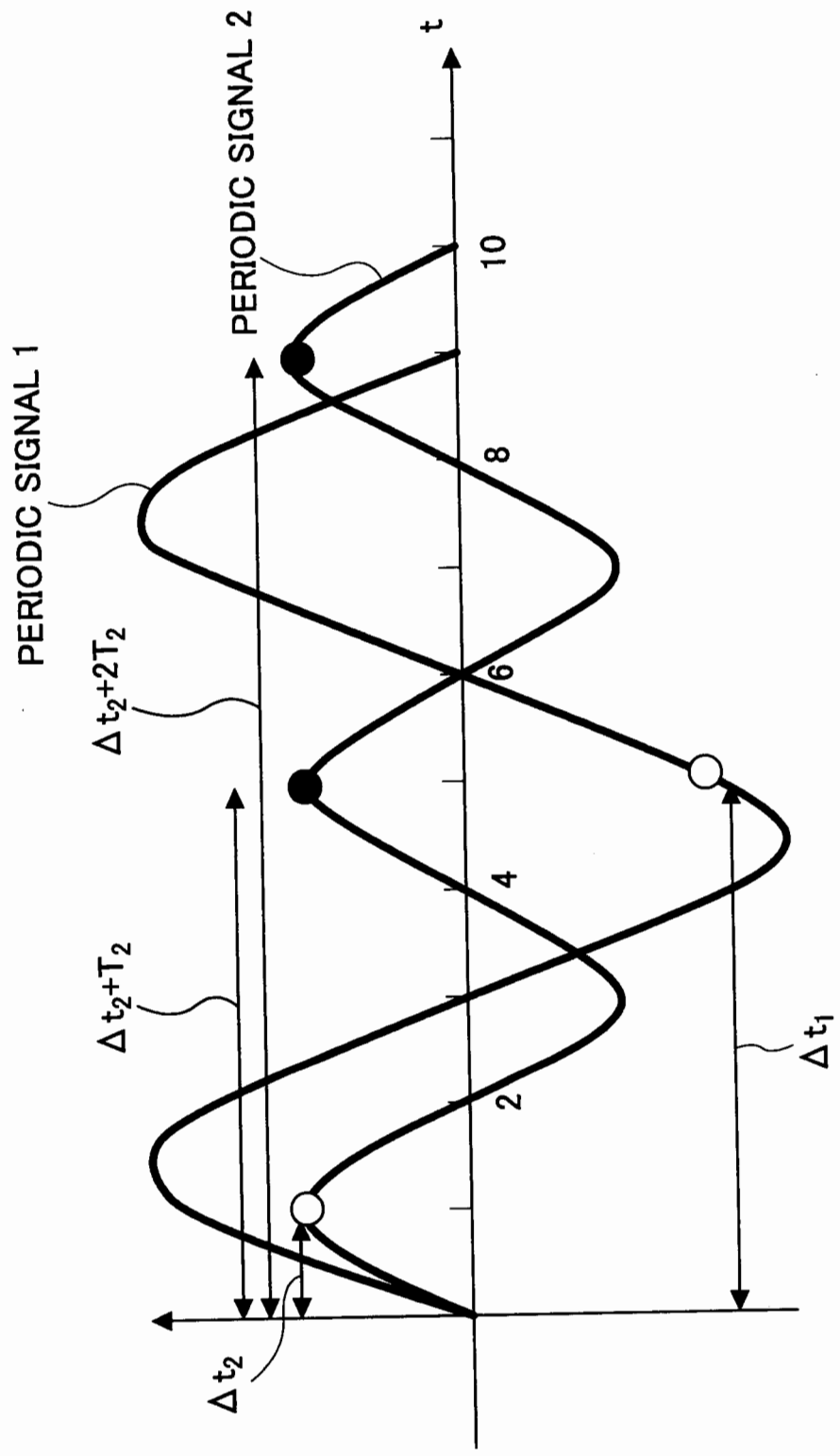


FIG.59

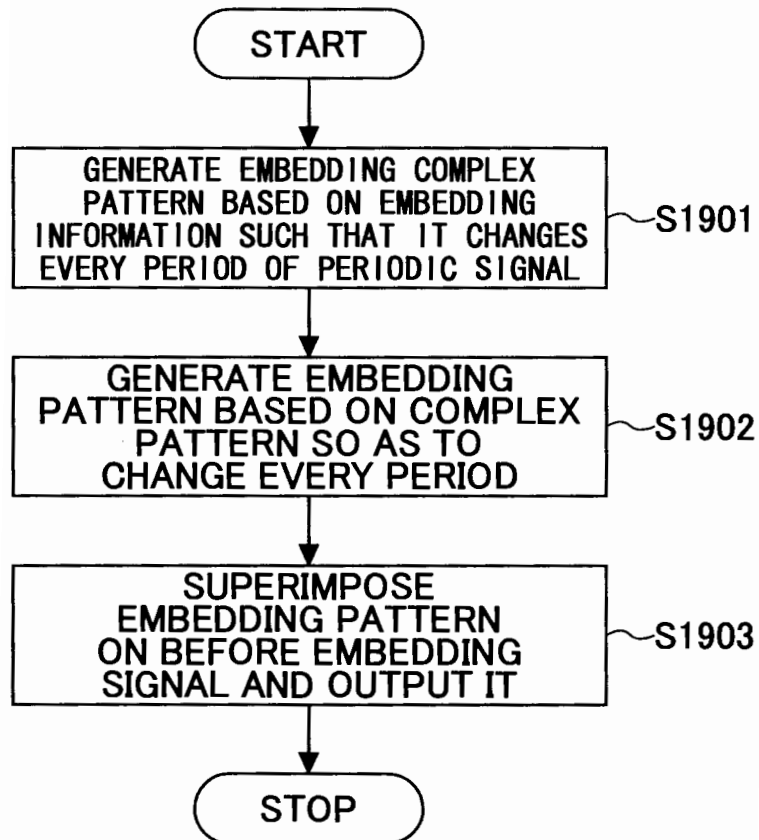


FIG.60

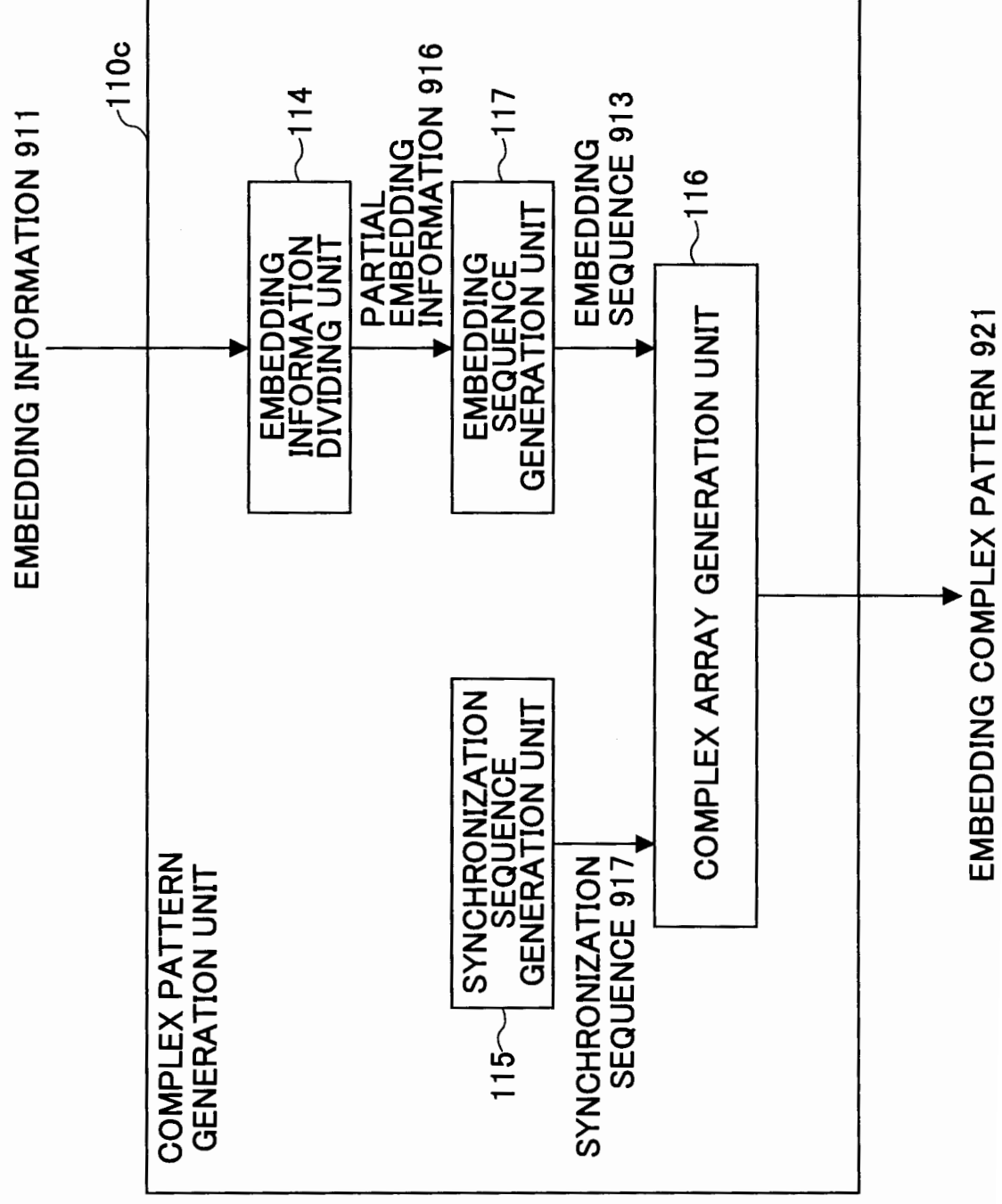


FIG.61

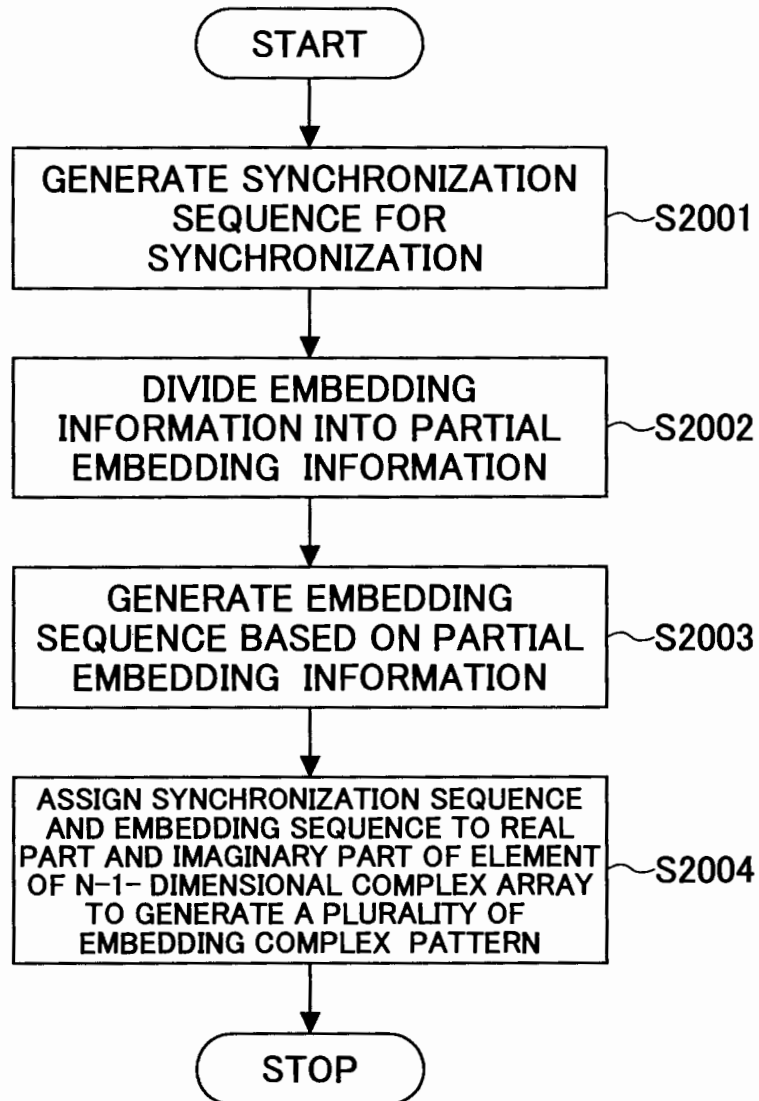


FIG.62

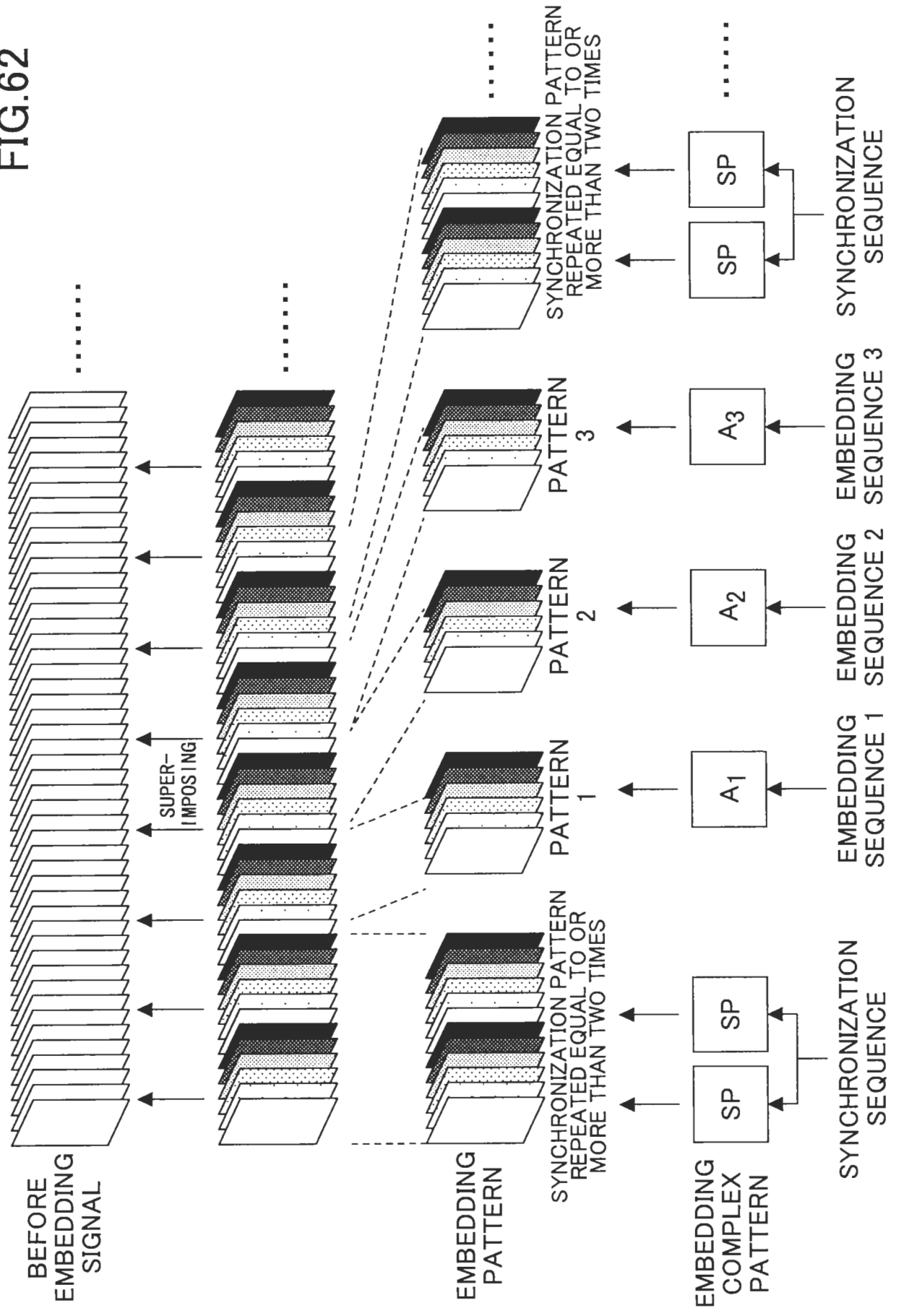


FIG.63

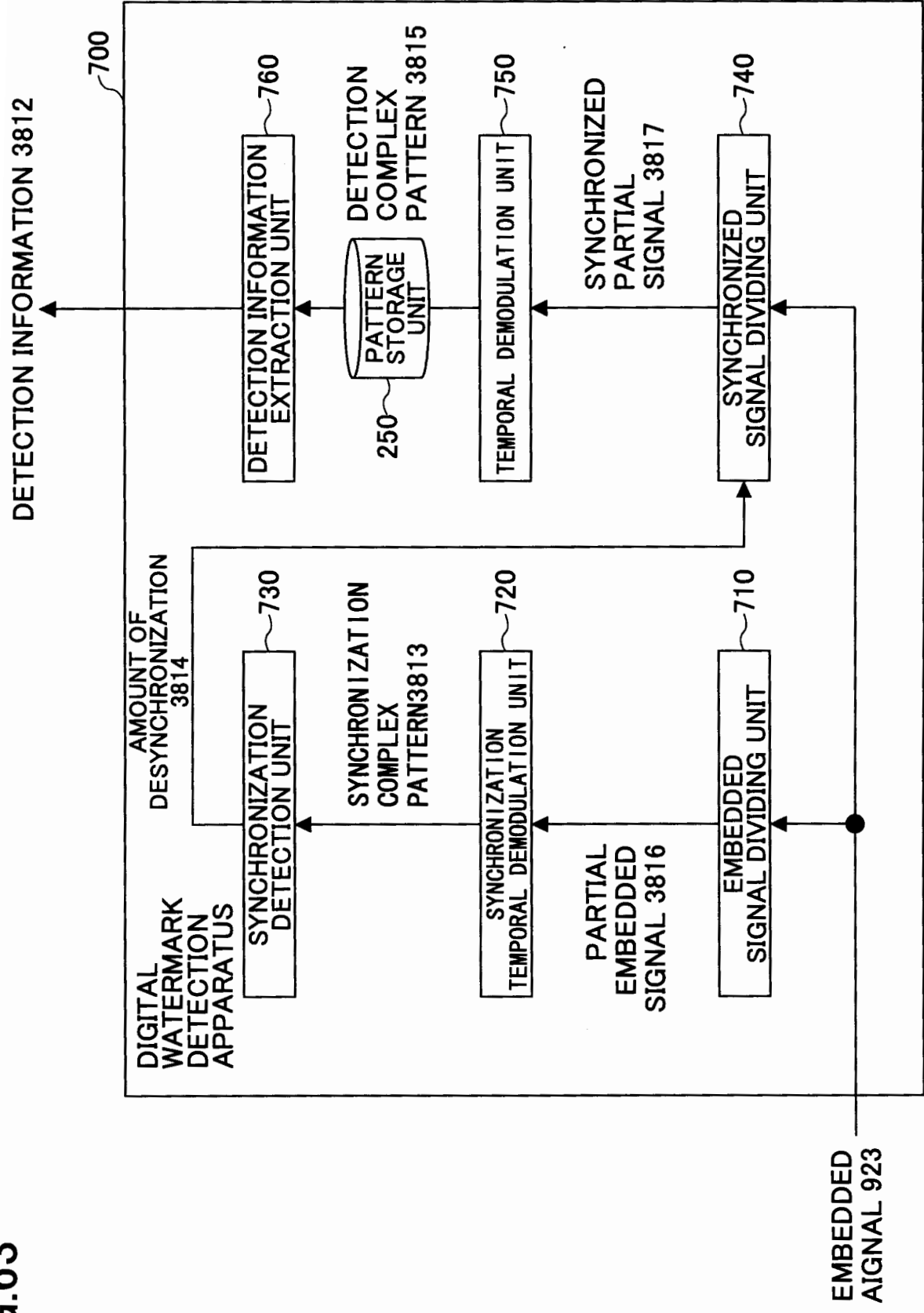


FIG.64

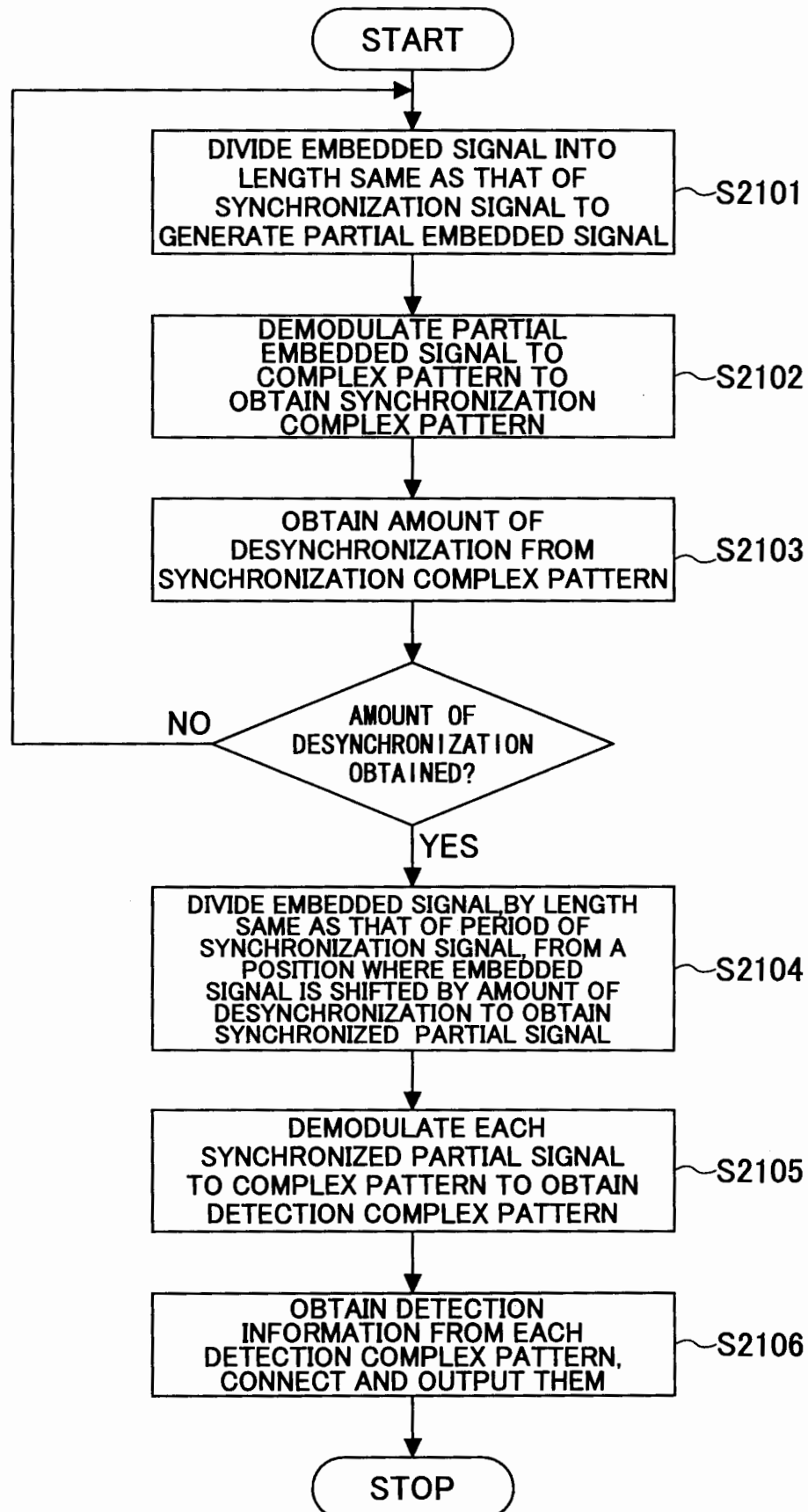


FIG.65

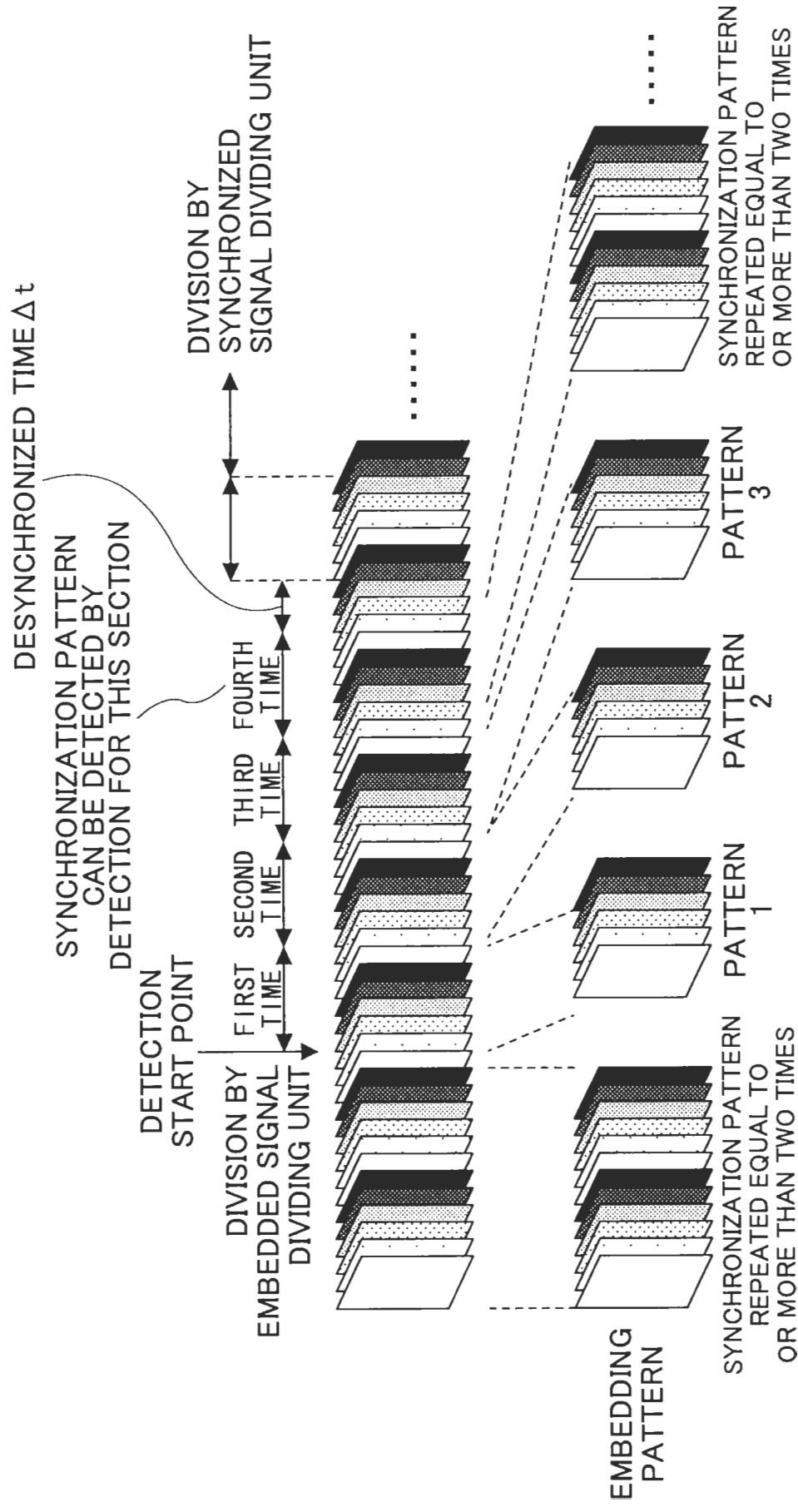


FIG.66

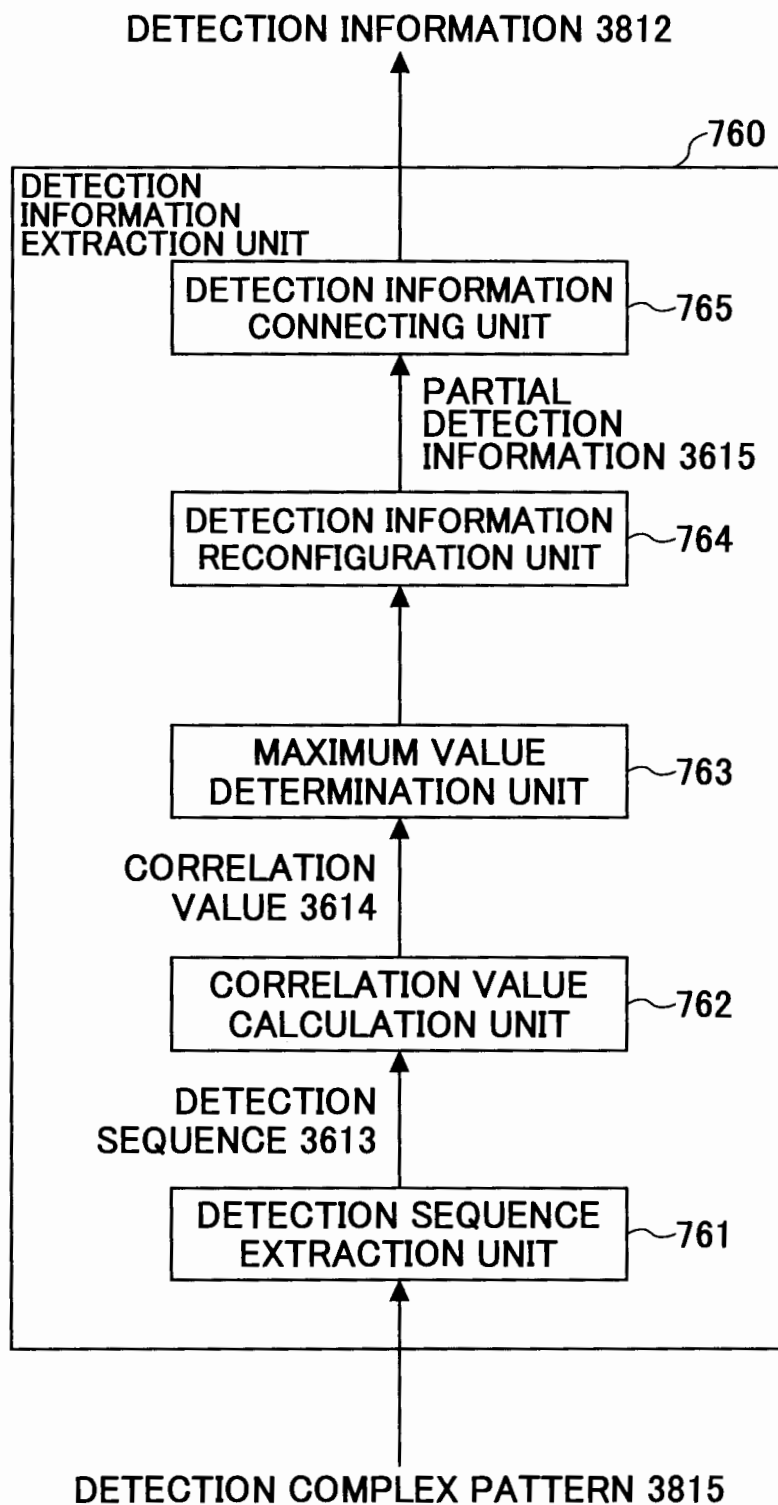


FIG.67

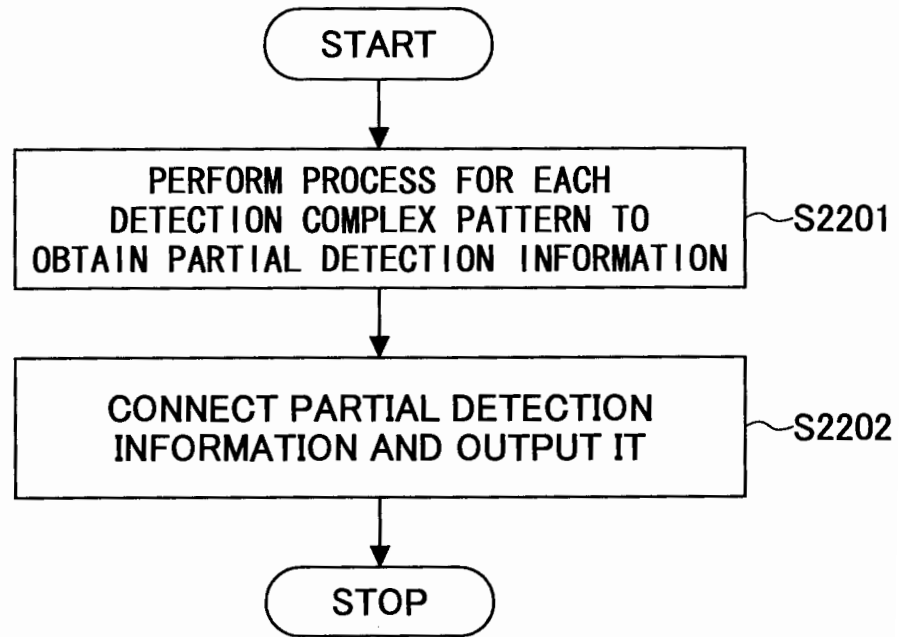


FIG.68

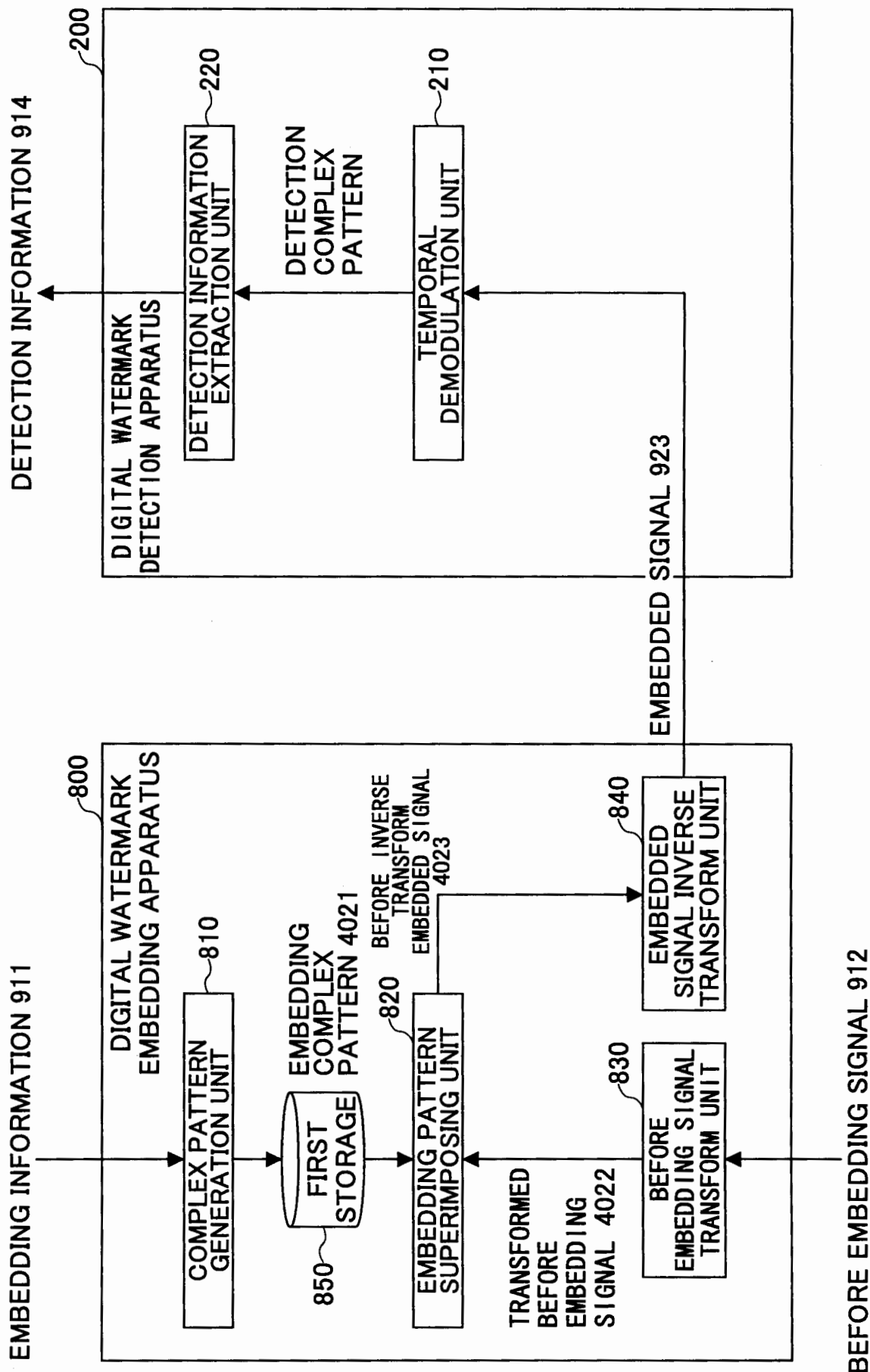


FIG.69

