

US00D934189S

(12) **United States Design Patent** (10) **Patent No.:** **US D934,189 S**
Shibata et al. (45) **Date of Patent:** **** Oct. 26, 2021**

(54) **CIRCUIT BOARD FOR POWER SEMICONDUCTOR MODULE**

(71) Applicant: **ROHM CO., LTD.**, Kyoto (JP)

(72) Inventors: **Kotaro Shibata**, Kyoto (JP); **Hideki Sawada**, Kyoto (JP)

(73) Assignee: **ROHM CO., LTD.**, Kyoto (JP)

(**) Term: **15 Years**

(21) Appl. No.: **29/725,414**

(22) Filed: **Feb. 25, 2020**

(30) **Foreign Application Priority Data**

Aug. 29, 2019 (JP) 2019-019212

(51) **LOC (13) Cl.** **13-03**

(52) **U.S. Cl.**
USPC **D13/182**

(58) **Field of Classification Search**

USPC D13/182; 257/678, 684, 690, 691;
361/679.01, 713, 728, 736, 760, 761, 772,
361/775, 783, 820; 174/250, 253;
438/15, 25, 26, 51, 55, 63, 64, 106
CPC . H01L 21/00; H01L 2224/42; H01L 2224/43;
H01L 2021/00; H01L 2021/02; H01L
2021/04; H01L 21/4814; H01L 21/4846;
H01L 21/4871; H01L 21/67144; H01L
23/12; H01L 23/13; H01L 23/14; H01L
23/147; H01L 2924/171; H01L
2924/1711; H01L 2924/1715; H01L
2924/17151; H01L 2924/181; H01L
2924/1811; H01L 2924/1815; H01L
2924/19042; H01L 2924/1905; H01L
2224/08054; H01L 23/58; H05B 41/14;
G02B 6/4256; G02B 6/4257; G02B
6/4261; G02B 6/4262; G02B 6/428;
G02B 6/4281; H05K 1/14; H05K 1/141;
H05K 1/142; H05K 1/144; H05K 1/18;

H05K 1/181; H05K 1/182; H05K 1/026;
H02B 1/015; H02B 1/00

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,347,160 A * 9/1994 Sutrina H01L 24/72
257/678

5,471,089 A * 11/1995 Nagatomo H01L 23/50
257/691

6,078,501 A 6/2000 Catrambone et al.
(Continued)

FOREIGN PATENT DOCUMENTS

JP 1536191 10/2015
JP 1536359 10/2015

(Continued)

Primary Examiner — Elizabeth J Oswecki

(74) *Attorney, Agent, or Firm* — Hamre, Schumann,
Mueller & Larson, P.C.

(57) **CLAIM**

The ornamental design for a circuit board for power semiconductor module, as shown and described.

DESCRIPTION

FIG. 1 is a front, top and right side perspective view of a circuit board for power semiconductor module showing our new design;

FIG. 2 is a front view thereof;

FIG. 3 is a rear view thereof;

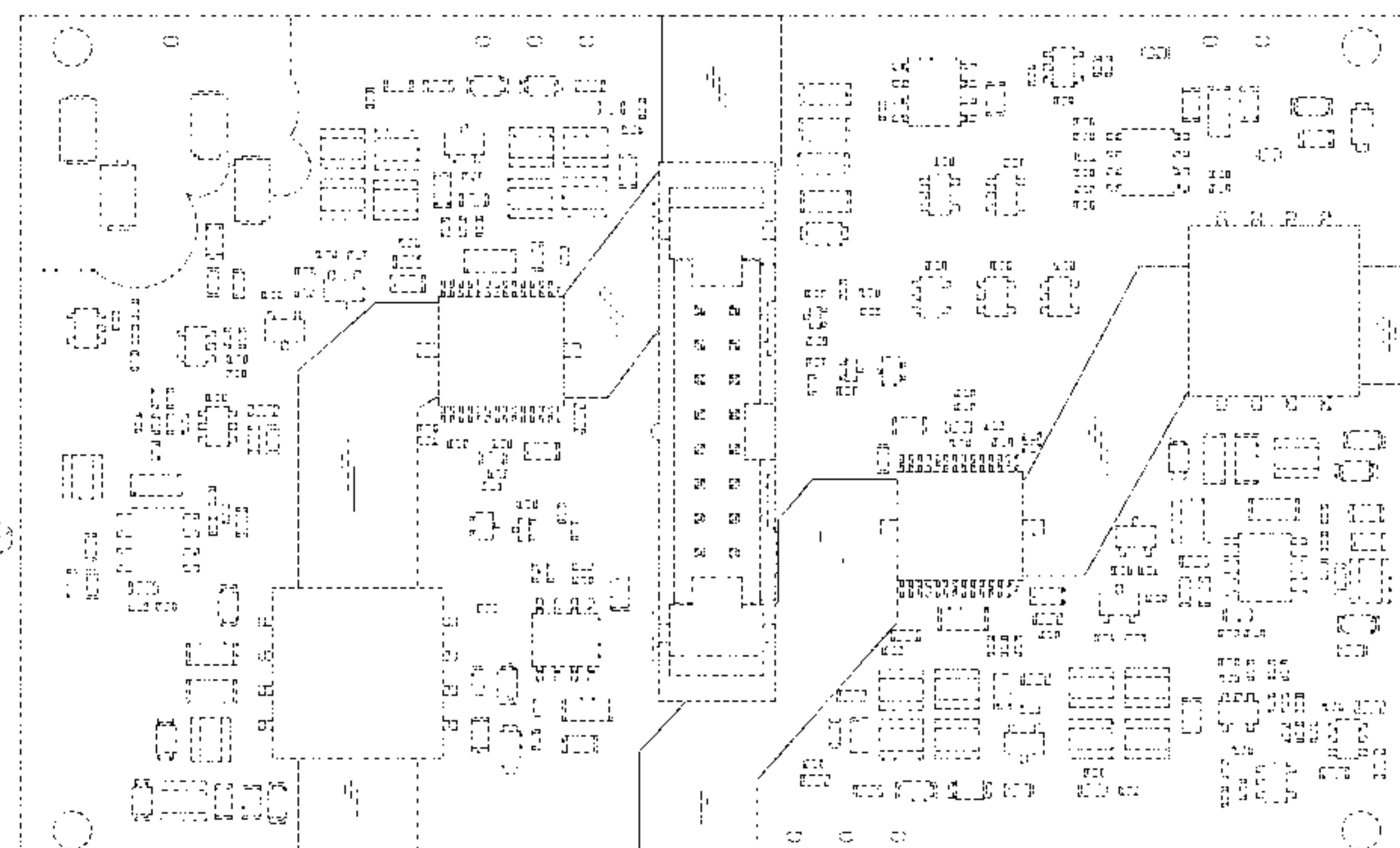
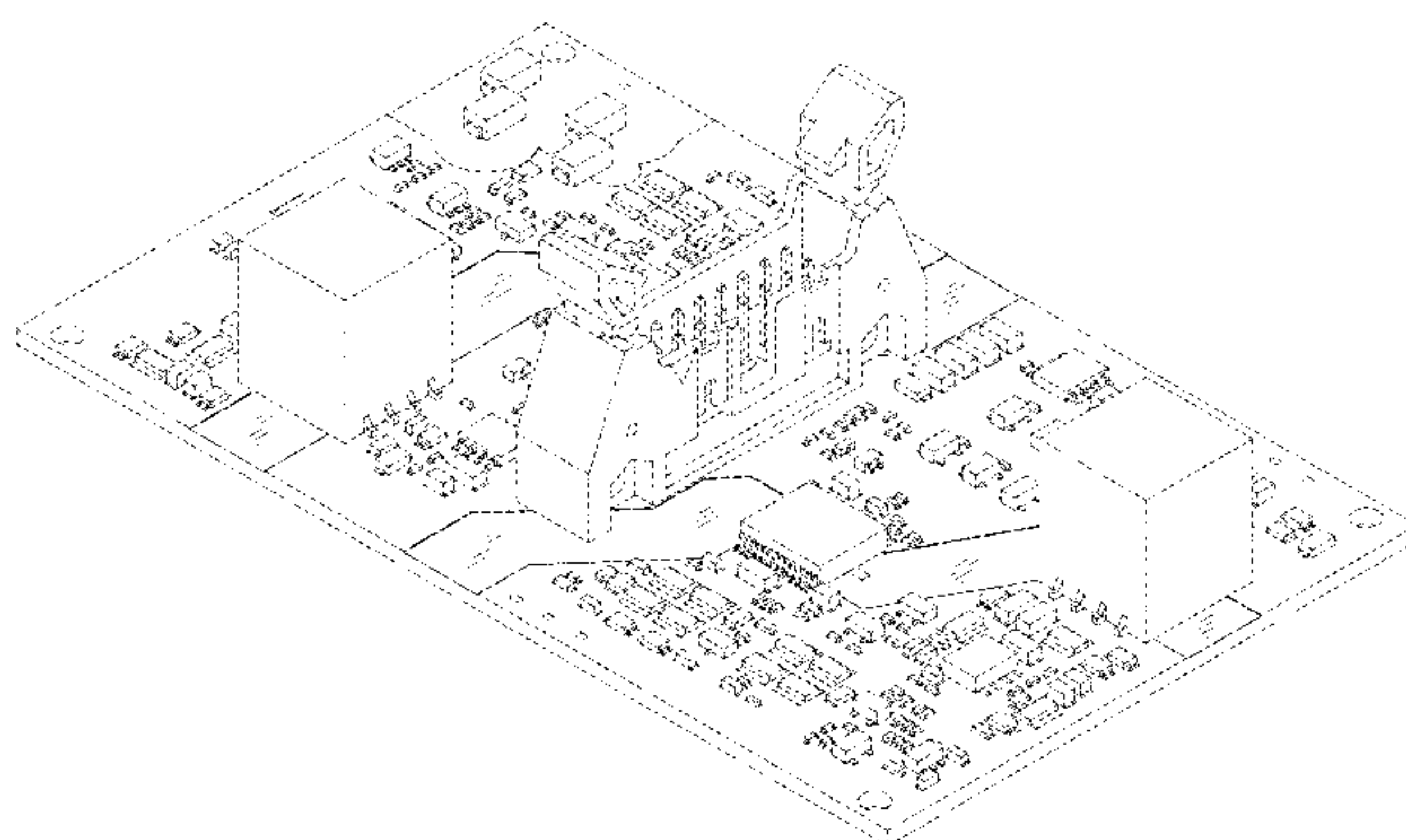
FIG. 4 is a top plan view thereof;

FIG. 5 is a right side view thereof; and,

FIG. 6 is a left side view thereof.

The broken lines illustrate portions of the circuit board for power semiconductor module that form no part of the claimed design.

1 Claim, 6 Drawing Sheets



(56)

References Cited

U.S. PATENT DOCUMENTS

6,774,465 B2

D699,693 S *

D748,595 S

D754,084 S

D762,185 S

D762,597 S

9,418,975 B1

D766,851 S

D772,184 S

D774,479 S

D775,091 S

D775,593 S

D776,071 S

D785,577 S

9,660,356 B1

D790,491 S

D798,832 S

D799,439 S

D805,485 S

D810,706 S

D847,103 S

D847,104 S

D858,467 S

D864,132 S

D875,058 S *

D883,240 S *

8/2004

2/2014

2/2016

4/2016

7/2016

8/2016

8/2016

9/2016

11/2016

12/2016

12/2016

1/2017

1/2017

5/2017

5/2017

6/2017

10/2017

10/2017

12/2017

2/2018

4/2019

4/2019

9/2019

10/2019

2/2020

5/2020

Lee et al.

Otsuka

Bertalan et al.

Kawase

Muehlensiep et al.

Bertalan et al.

Yoneyama et al.

Yoneyama et al.

Soyano et al.

Soyano et al.

Edenharter et al.

Edenharter et al.

Edenharter et al.

Kawase

Nakamura

Hayashida et al.

Hayashida et al.

Hayashiguchi

Kawase

Soyano et al.

Sawada

Sawada

Sawada

Sawada

Sawada

Fathauer

D13/182

D13/182

H05K 1/115

D13/182

D887,998 S *

D887,999 S *

D888,674 S *

D892,754 S

D903,611 S

D903,612 S

D904,325 S *

D909,319 S *

2001/0038143 A1

2008/0142948 A1

2014/0168900 A1 *

2016/0190915 A1

2016/0276927 A1 *

2016/0284618 A1

2016/0336245 A1

2016/0372392 A1 *

6/2020

6/2020

6/2020

8/2020

12/2020

12/2020

12/2020

2/2021

11/2001

6/2008

6/2014

6/2016

9/2016

9/2016

11/2016

12/2016

Krasnopolski

Chen

Chen

Beckedahl et al.

Sannai et al.

Soyano et al.

Omichi

Nordeen

Sonobe et al.

Matsumoto

Korich

Horiuchi et al.

Das

Tsukamoto et al.

Egusa et al.

Sakamoto

D13/182

D13/182

D13/182

D13/182

D13/182

H05K 7/1432

361/709

H01L 23/3735

H01L 23/055

FOREIGN PATENT DOCUMENTS

JP

JP

JP

JP

JP

JP

JP

1536360

1585830

1585831

1585962

1603793

1603980

1605558

10/2015

9/2017

9/2017

9/2017

5/2018

5/2018

6/2018

* cited by examiner

FIG.1

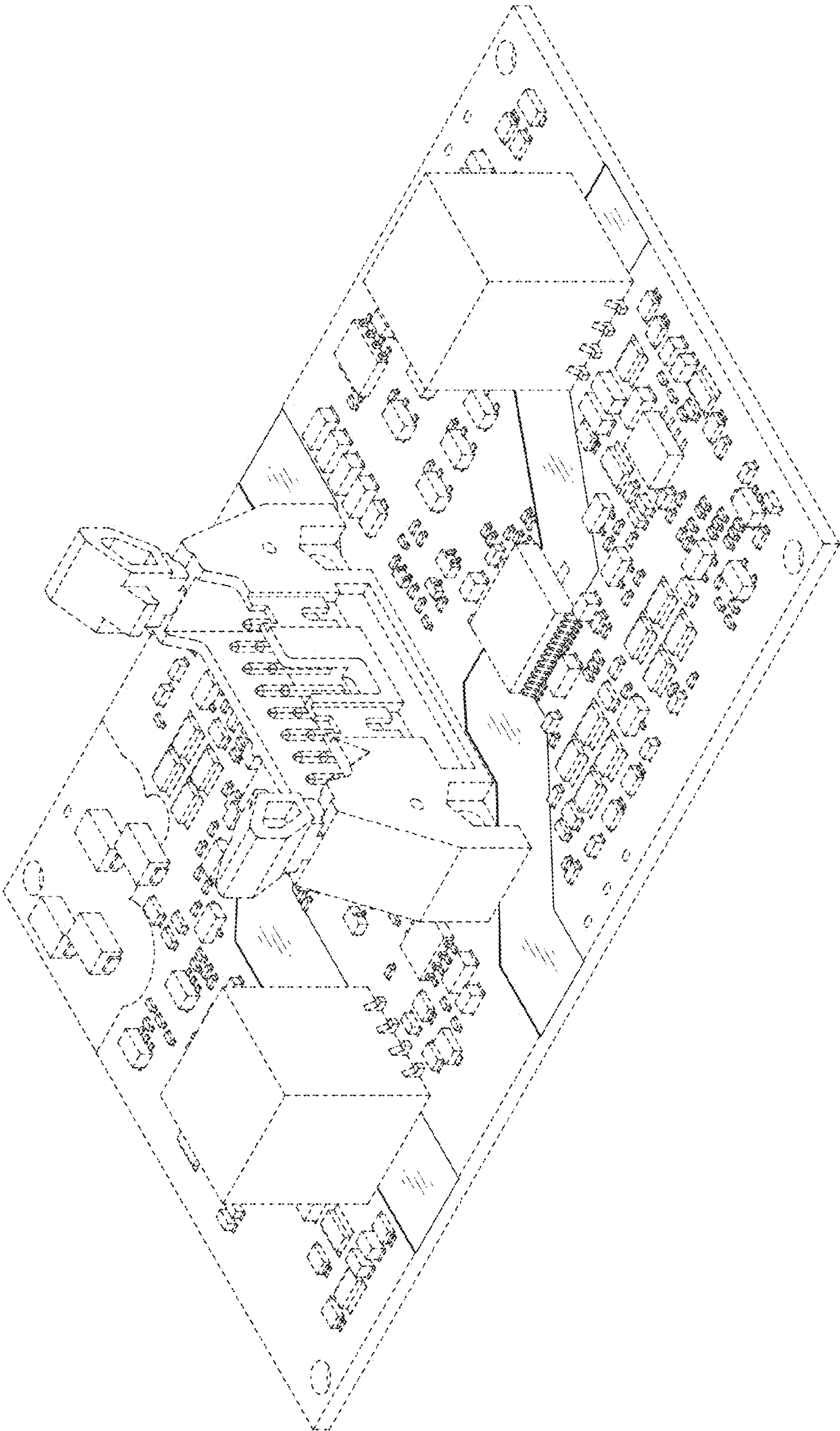


FIG.2

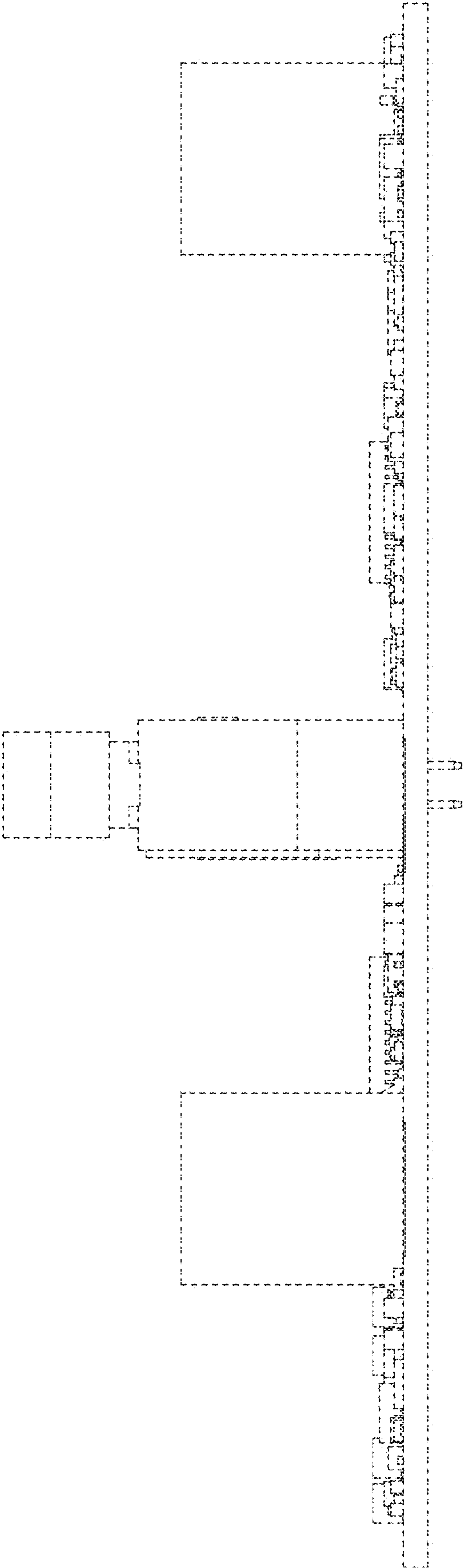


FIG. 3

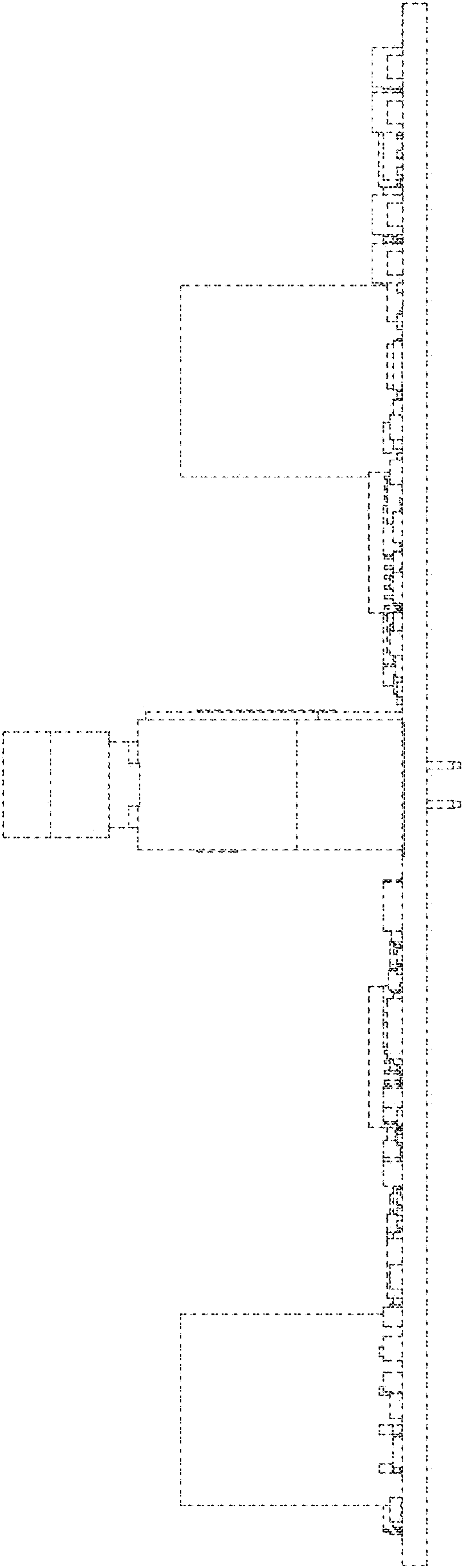


FIG.4

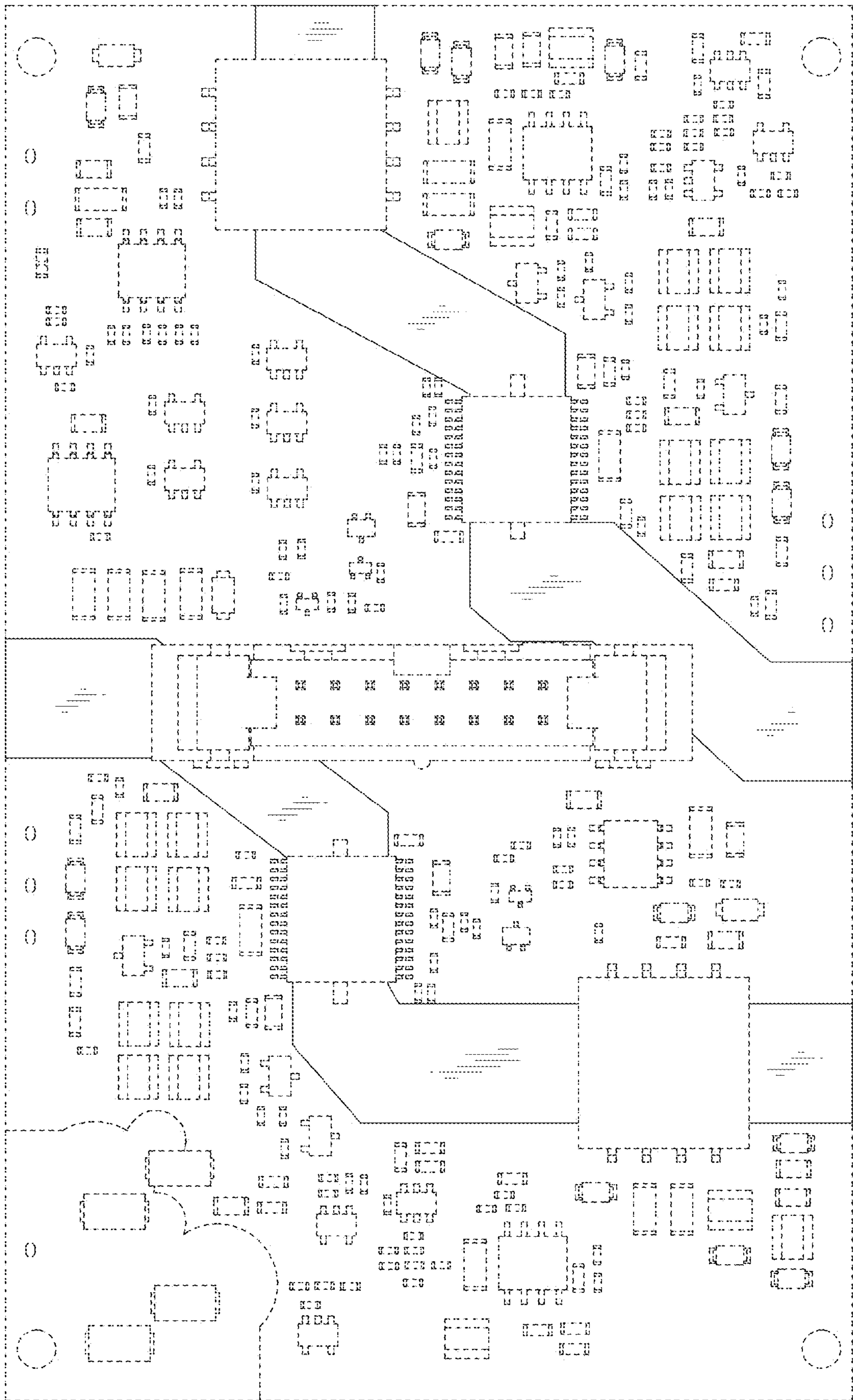


FIG. 5

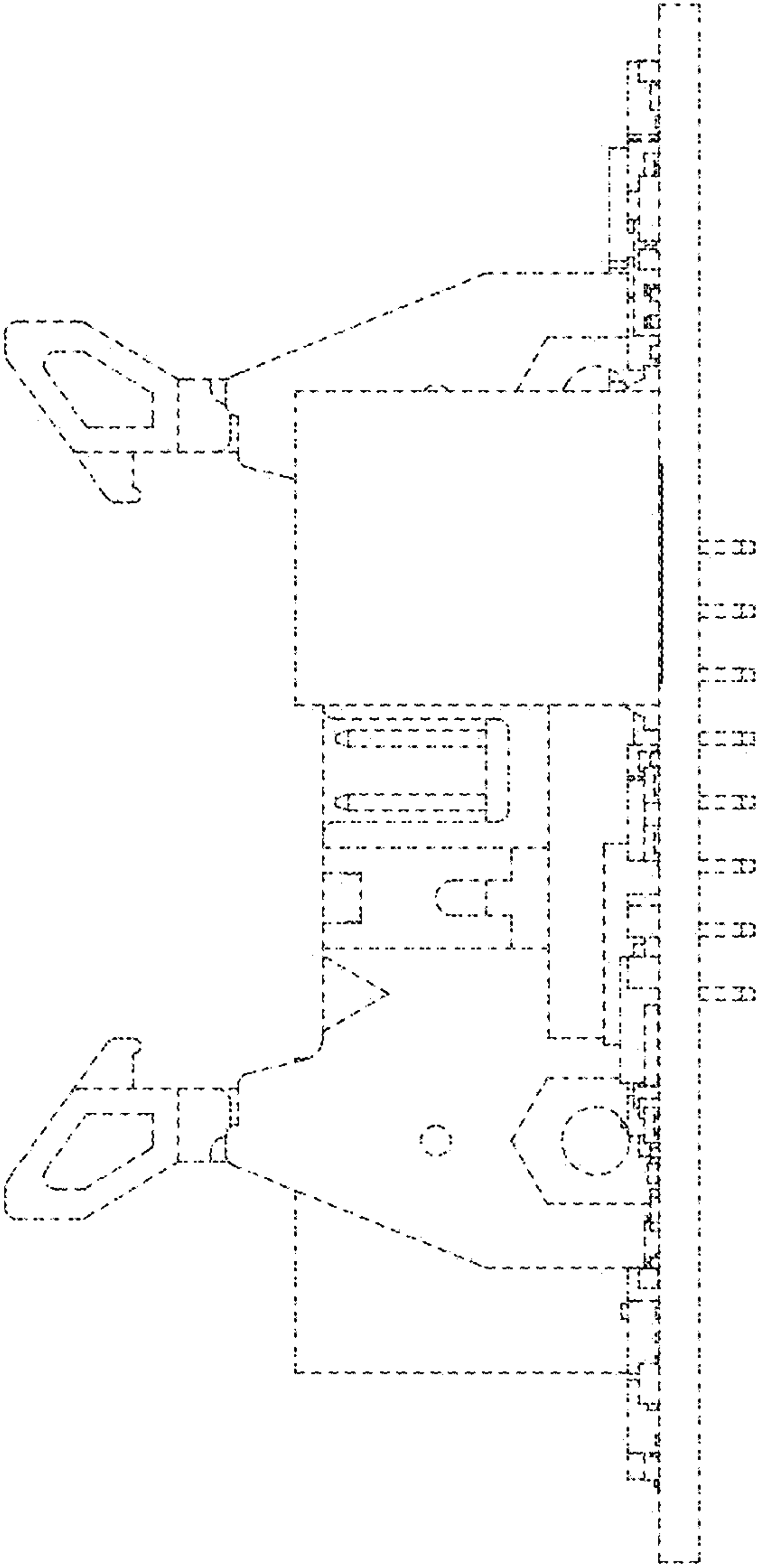


FIG. 6

