IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

DIVERSIFIED OBSERVATION LLC	)
	)
Plaintiff,	)
	) Civil Action No. _____
v.	)
	) **JURY TRIAL DEMANDED**
BROTHER INTERNATIONAL CORPORATION	)
	)
Defendant.	)
	)

COMPLAINT

For its Complaint, Plaintiff Diversified Observation LLC ("Plaintiff" or "Diversified Observation"), by and through the undersigned counsel, alleges as to the activities of Defendant Brother International Corporation ("Brother") as follows:

THE PARTIES

1. Diversified Observation is a Texas company with a place of business located at 5068 W. Plano Pkwy, Suite 300, Plano, Texas 75093.

2. Defendant Brother International Corporation is a Delaware corporation with a place of business located at 200 Crossing Boulevard, Bridgewater, New Jersey 08807.

JURISDICTION AND VENUE

3. This action arises under the Patent Act, 35 U.S.C. §1 *et seq.*

4. Subject matter jurisdiction is proper in this Court under 28 U.S.C. §§1331 and 1338.

5. Brother has purposefully availed itself of the rights and benefits of Delaware law by engaging in systematic and continuous contacts with the state of Delaware, including by selling printers and other electronic products in Delaware, directly or through affiliates, and by continuously and systematically placing goods into the stream of commerce for distribution

throughout Delaware. Brother also derives substantial revenue from the sale of those products in Delaware. Brother also regularly conducts and solicits business within the State of Delaware.

6. Venue is proper in this district pursuant to § 1400(b) because Brother is incorporated in Delaware.

THE PATENTS-IN-SUIT

7. On July 2, 2002, the USPTO duly and lawfully issued United States Patent No. 6,414,461 (the "'461 Patent"), entitled "Scanner that Controls Stepping Motor Torque." A true and correct copy of the '461 Patent is attached hereto as Exhibit A.

8. On February 18, 2003, the USPTO duly and lawfully issued United States Patent No. 6,522,432 (the "'432 Patent"), entitled "Image Scanner with Automatic Signal Compensation." A true and correct copy of the '432 Patent is attached hereto as Exhibit B.

9. Diversified Observation is the assignee and owner of the right, title and interest in and to the '461 and '432 patents, including the right to assert all causes of action arising under said patents and the right to any remedies for infringement of them.

COUNT I – INFRINGEMENT OF UNITED STATES NO. 6,414,461

10. Diversified Observation repeats and realleges the allegations of the previous paragraphs as if fully set forth herein.

11. Without license or authorization and in violation of 35 U.S.C. § 271(a), Brother has infringed and continues to infringe at least Claim 1 of the '461 patent by making, using, importing, offering for sale, or selling scanners, including, but not limited to, the MFC-L6750DW and MFC-9330CDW.

12. Claim 1 of the '461 Patent reads:

> 1. A scanner comprising: a housing having a transparent platform, a document to be scanned being placed on the transparent platform; a scanning

module movably installed inside the housing for scanning the document; a driving module installed inside the housing for driving the scanning module, the driving module comprising:

a stepping motor for driving the scanning module forward and backward so that the scanning module scans the document; and

a motor driving circuit for controlling the stepping motor according to a driving signal; and

a control circuit for controlling the operations of the scanner, the control circuit comprising a memory, the memory storing a torque table and a driving program, the torque table recording a plurality of torque values, each of the torque values corresponding a predetermined condition when the stepping motor produces the corresponding torque, and the driving program chooses one of the torque values according to the predetermined condition, the motor driving circuit receiving the corresponding driving signal according to the torque value chosen by the driving program and controlling the stepping motor so that the stepping motor generates a torque according to the driving signal;

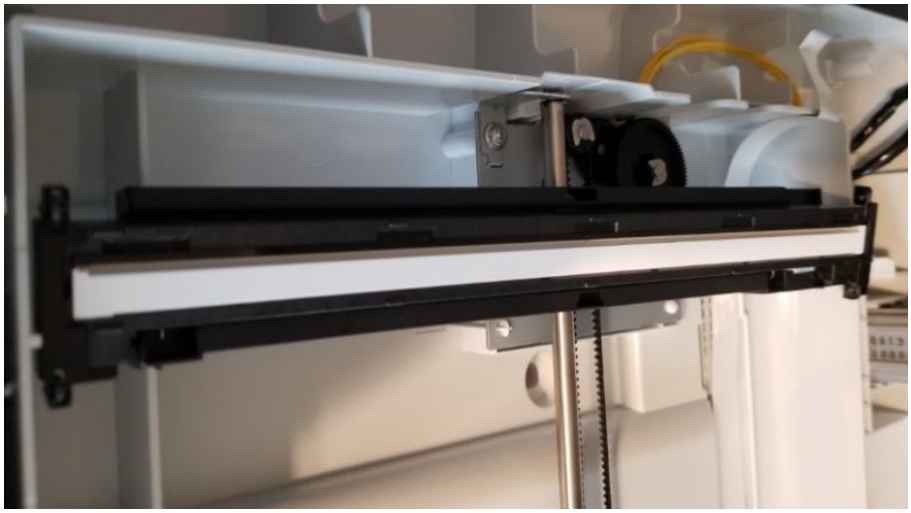
wherein the control circuit controls the stepping motor to generate different torque so that the scanning module scans the document at different speeds.

Exh. A at 4:58 to 5:18.

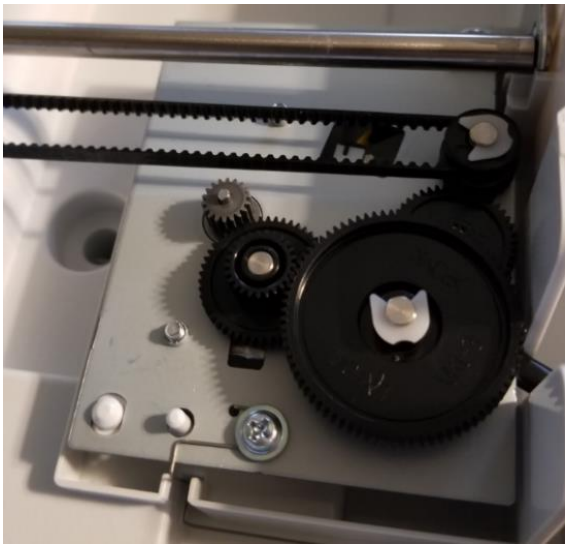
13. The MFC-L6750DW includes a scanner comprising a housing, a scanning module, a driving module, a stepping motor, a motor driving circuit for controlling the stepping motor and a control circuit for controlling the operations of the scanner.

14. The MFC-L6750DW includes a housing having a transparent platform, a document to be scanned may be placed on the transparent platform:

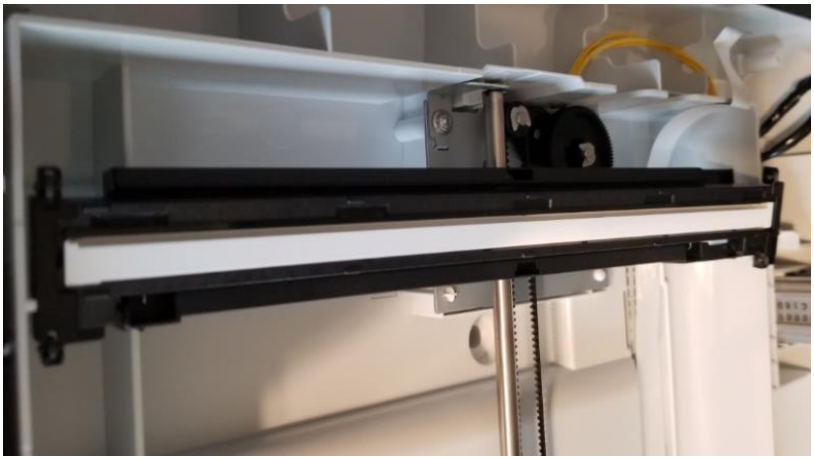
15. The MFC-L6750DW includes a scanning module moveably installed inside the housing for scanning the document:

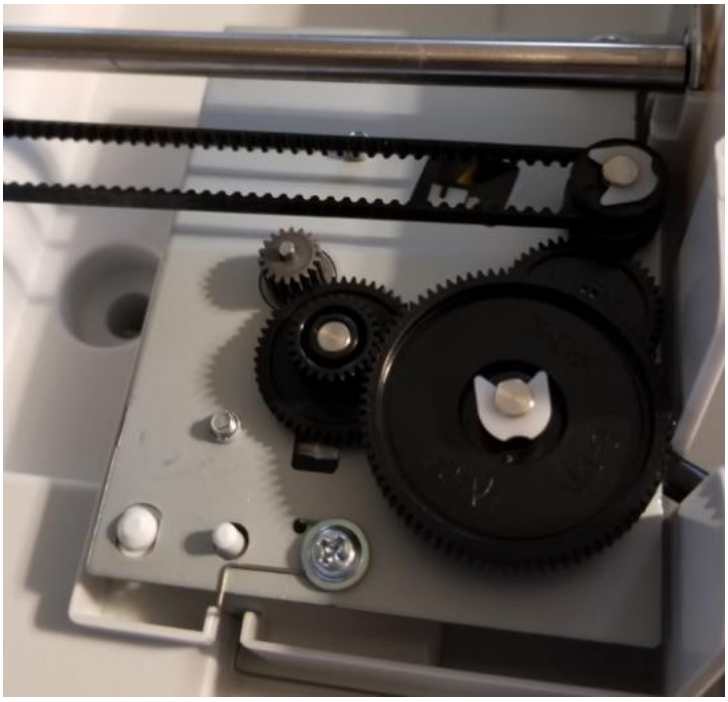


16. It includes a driving module installed inside the housing for driving the scanning module:



17. The driving module of the MFC-L6750DW includes a stepping motor for driving the scanning module forward and backward so that the scanning module scans the document:






M35SP-11NK
LF .A138
T 2B7510
15Ω

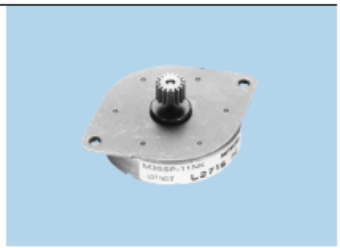
MITSUMI

Stepping Motors

M35SP-11NK

FEATURES

1. Thin, high resolution and high-output torque.
2. Superior running quietness and stability.



USES

Multifunction machines, scanners, etc.

See http://www.mitsumi.co.jp/latest/Catalog/pdf/motor_m35sp_11nk_e.pdf ("Mitsumi") (last accessed Apr. 23, 2018).

18. The driving module of the MFC-L6750DW includes a motor driving circuit (e.g., the Toshiba TB6575FNG) for controlling the stepping motor according to a driving signal:

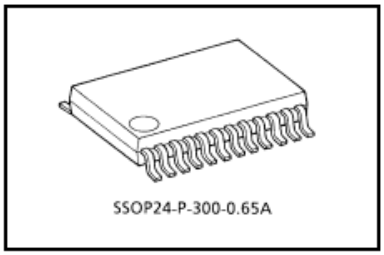
TOSHIBA TB6575FNG

TOSHIBA CMOS Integrated Circuit Silicon Monolithic

TB6575FNG

PWM Sensorless Controller for 3-Phase Full-Wave BLDC Motors

The TB6575FNG provides sensorless commutation and PWM current control for 3-phase full-wave BLDC motors. It controls rotation speed by changing a PWM duty cycle by analog voltage.



Weight: 0.14 g (typ.)

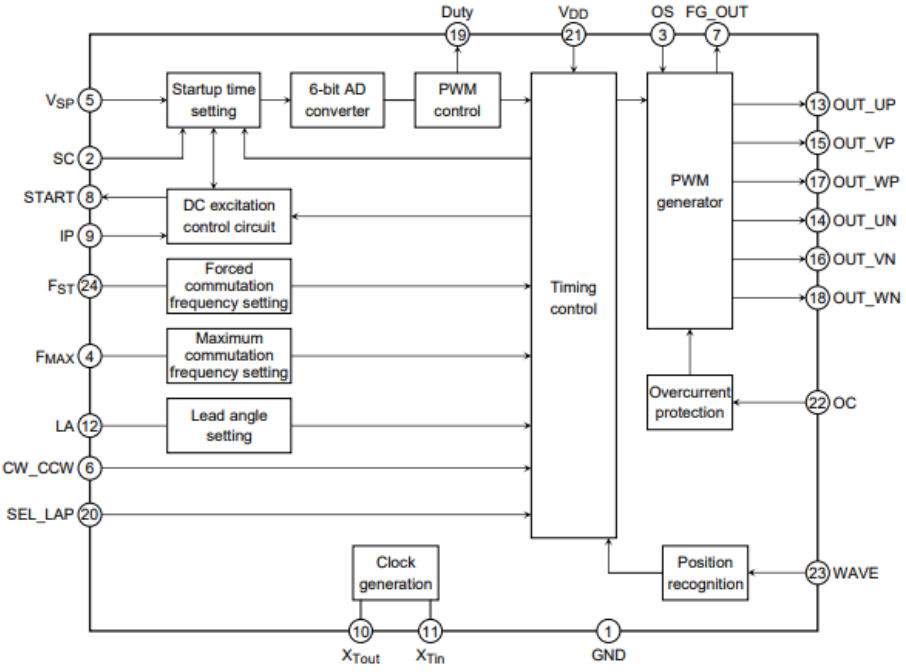
Features

- 3-phase full-wave sensorless drive
- PWM chopper drive
- PWM duty cycle control by analog input
- 20-mA current sink capability on PWM output pins
- Overcurrent protection
- Forward/reverse rotation
- Lead angle control (7.5° and 15°)
- Overlap commutation
- Rotation speed sensing signal
- DC excitation mode to improve startup characteristic
- DC excitation time and forced commutation time for startup operation can be changed.
- Forced commutation frequency can be selected. ($f_{XT}/(6 \times 2^{16})$, $f_{XT}/(6 \times 2^{17})$, $f_{XT}/(6 \times 2^{18})$)
- Output polarity switching (P-channel + N-channel, N-channel + N-channel)

https://toshiba.semicon-storage.com/info/docget.jsp?did=2162&prodName=TB6575FNG ("Datasheet") (last accessed Apr. 23, 2018).

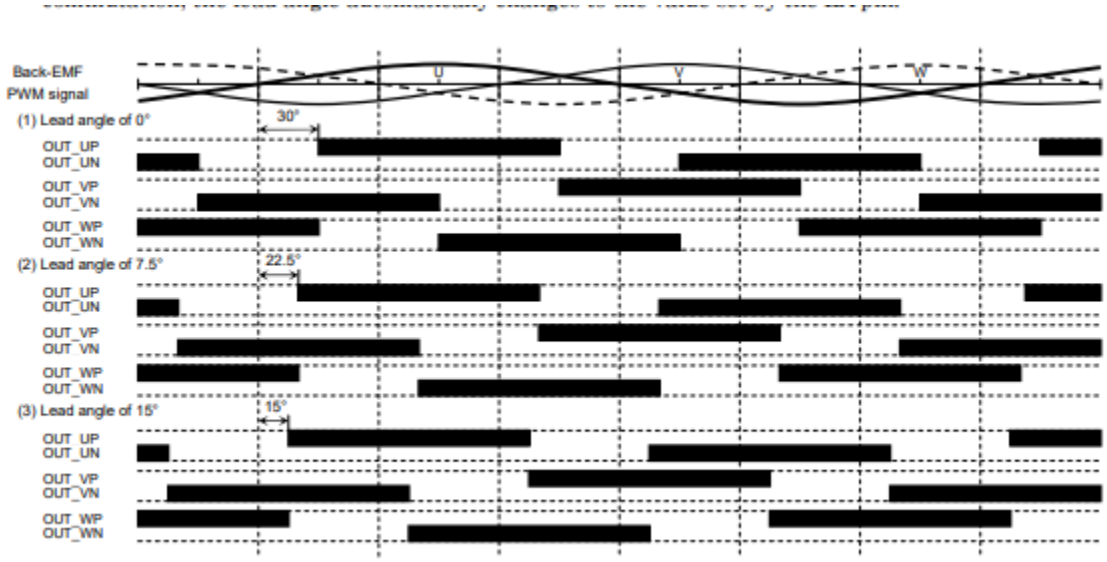
19. The MFC-L6750DW includes a control circuit for controlling the operations of the scanner:

Block Diagram



See Datasheet at p. 2.

20. The control circuit includes a memory (e.g., control logic). The memory stores a torque table and a driving program:

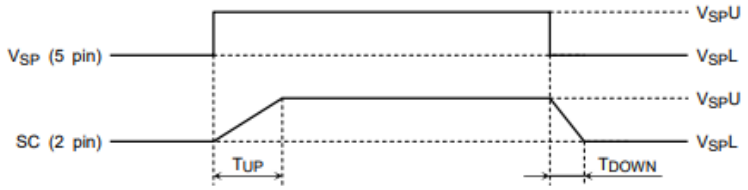


See id. at p. 9.

21. The torque table includes a plurality of torque values, each of the torque values corresponds to a predetermined condition when the stepping motor produces the corresponding torque, and the driving program chooses one of the torque values according to the predetermined condition:

3. SC Signal Delay in Rotational Speed Control (V_{SP} Follow-Up Property)

The V_{SP} input is used to control the motor speed; the TB6575FNG allows the motor to start, stop and change the speed according to the voltage at V_{SP}. However, the actual operation of the IC is determined by the voltage applied to the SC input. The voltage at the SC input equals the charging voltage of the capacitor C1, which depends on its charging and discharging times. This causes a delay in the rise and fall times of the SC voltage level. The following figure shows the SC delay that occurs when V_{SP} changes between 1 V and 4 V.

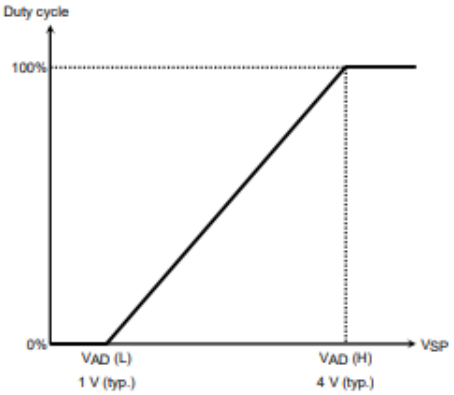


Id. at p. 6.

6. Speed control V_{SP} pin

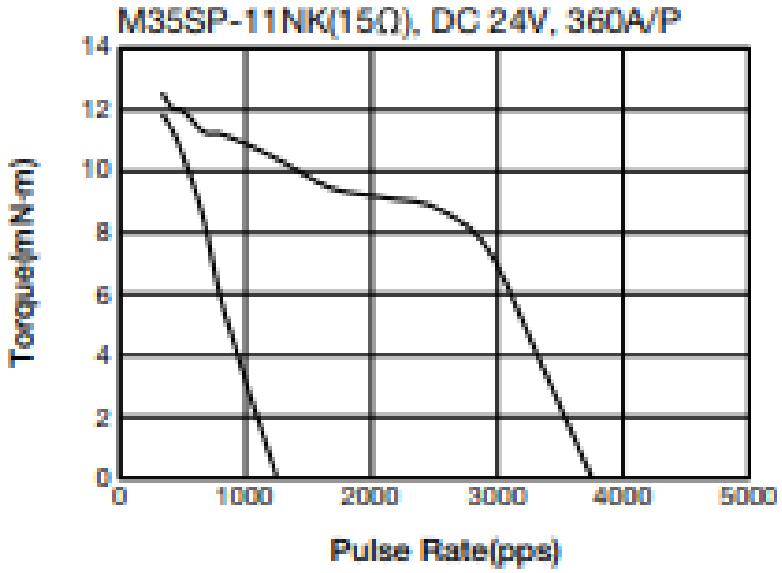
An analog voltage applied to the V_{SP} pin is converted by the 6-bit AD converter to control the duty cycle of the PWM.

$0 \le V_{DUTY} \le V_{AD}$ (L)
→ Duty cycle = 0%
V_{AD} (L) $\le V_{DUTY} \le V_{AD}$ (H)
→ Figure at the right (1/64 to 63/64)
V_{AD} (H) $\le V_{DUTY} \le V_{DD}$
→ Duty cycle = 100% (63/64)



Id. at p. 7.

22. The motor driving circuit receives the corresponding driving signal according to the torque value chosen by the driving program and controls the stepping motor so that the stepping motor generates a torque according to the driving signal:



See Mitsumi.

23. The control circuit of the MFC-L6750DW controls the stepping motor to generate different torque so that the scanning module is capable of scanning the document at different speeds. As an example, the control circuit modifies the torque output of the stepping motor so that the scanning module scans the document more slowly for color documents and faster for black and white documents:

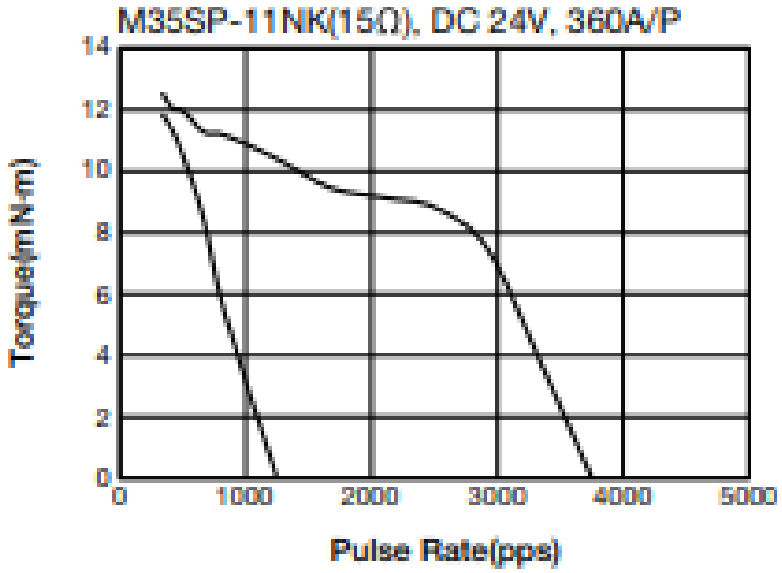
1. **Scan Type:** Depending on your scanning application, there will be several different scan types to choose from.

    a. Some common choices are Black and White, Grayscale, 256 Color, and 24-bit Color.
    b. Documents scanned in 24-bit color will produce much larger files and therefore take longer to scan than other scan types.
    c. Always select the simplest appropriate Scan type in order to maximize scan speed.

2. **Resolution:** Resolution (DPI) is the amount of information scanned per square inch.

    a. Text documents are usually set to 100 dpi while color pictures are usually set to 300 dpi or higher.
    b. Images scanned with a higher DPI will be sharper, but the file size would be larger therefore increasing scanning speed.
    c. Always select the smallest acceptable resolution in order to maximize scan speed.

See https://help.brother-usa.com/app/answers/detail/a_id/67127/~/what-is-the-maximum-scanning-speed-of-my-brother-machine%3F (last accessed Apr. 23, 2018).



See Mitsumi.

24. As shown above, the MFC-L6750DW includes every element recited by Claim 1 of the '461 Patent.

25. Diversified Observation is entitled to recover from Brother the damages sustained by Diversified Observation as a result of Brother's infringement of the '461 patent in an amount subject to proof at trial, which, by law, cannot be less than a reasonable royalty, together with interest and costs as fixed by this Court under 35 U.S.C. § 284.

COUNT II – INFRINGEMENT OF UNITED STATES NO. 6,522,432

26. Diversified Observation repeats and realleges the allegations of the previous paragraphs as if fully set forth herein.

27. Without license or authorization and in violation of 35 U.S.C. § 271(a), Brother has infringed and continues to infringe at least Claim 1 of the '432 patent by making, using, importing, offering for sale, and/or selling an image scanner for scanning a document, including, but not limited to, MFC L6750DW.

28. Claim 1 of the '432 Patent reads:

1. An image scanner for scanning a document comprising:

(1) a test region;

(2) a light source for illuminating the document and the test region;

(3) optical means for conveying the light reflected from the document and the test region;

(4) a line image sensor for receiving the light from the optical means and generating an image signal corresponding to the light reflected from the document and a brightness signal corresponding to the light reflected from the test region; the line image sensor comprising an array of (red, green, blue)(R,G,B) sensing elements for converting the light received from the optical means into an array of corresponding (R,G,B) signals wherein both the image signal and the brightness signals generated by the line image sensor are formed by an array of (R,G,B) signals; and

(5) a signal compensation circuit for amplifying the image signal according to the brightness signal to compensate the instability of the light source; the signal compensation circuit comprising an A/D converter for digitizing the (R,G,B) signals of the image signal and the brightness signal, and a digital processor for adjusting the digitized (R,G,B) signals of the image signal according to the digitized (R,G,B) signals of the brightness signal.

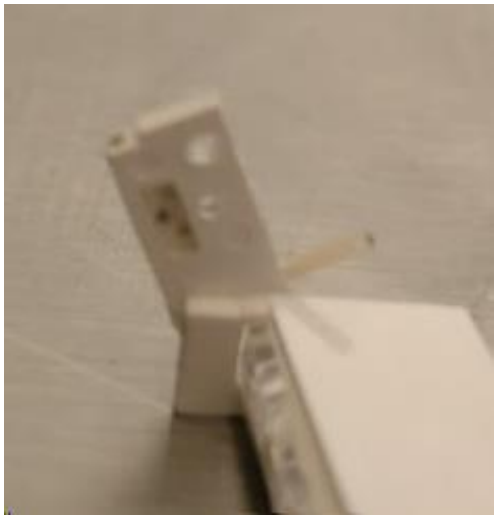
Exh. B at 5:12-38.

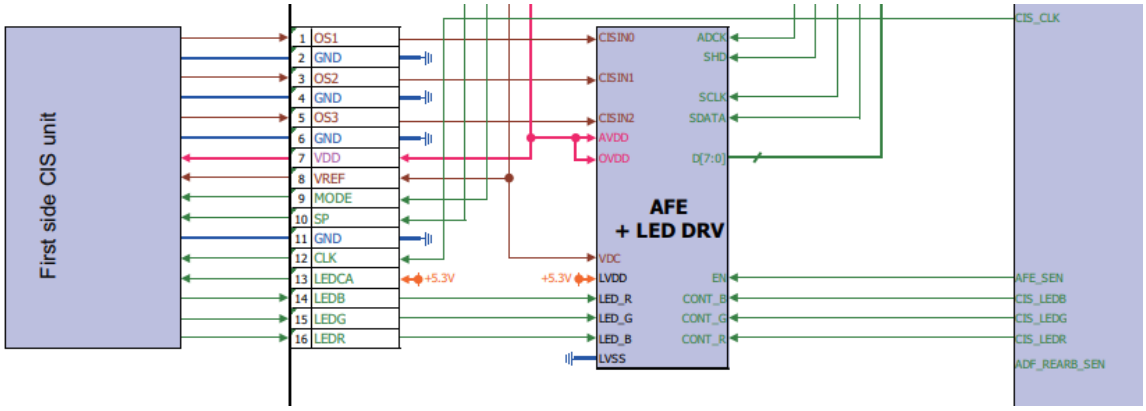
29. Specifically, the MFC L6750DW includes an image scanner for scanning a document:

30. The MFC L6750DW flatbed scanner module includes a test region:

31. The MFC L6750DW includes a light source for illuminating the document and the test region. The MFC L6750DW also includes a contact image sensor ("CIS") that includes a light source for illuminating the document to be scanned and the test region:

32. The light source of the MFC L6750DW CIS module includes an RGB:



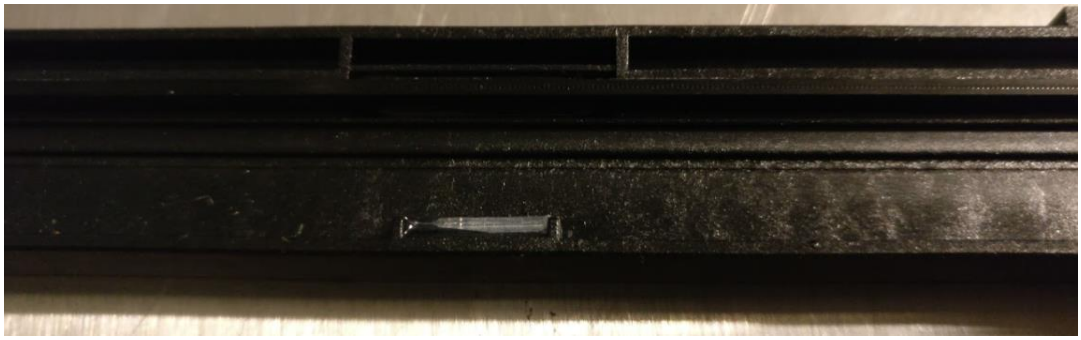


Brother Laser MFC Service Manual at p. 6-1 ("Service Manual") (available at http://www.net-on.inf.br/arquivos/media/downloads/manual-de-servico-mfc-l5902mfc-l6702mfc-l6902.pdf (last accessed Apr. 23, 2018)).

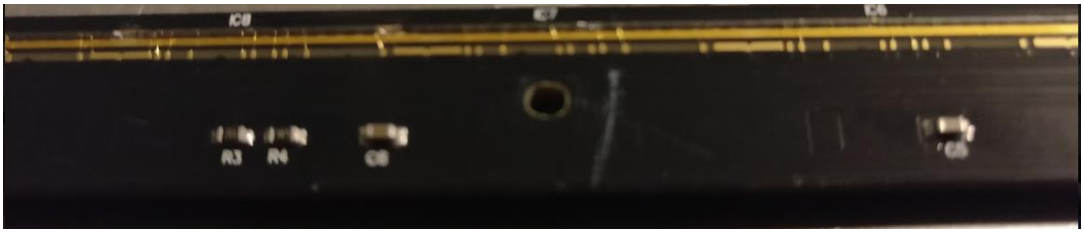
33. The CIS module includes a rod lens that directs light generated by the LEDs to the document and the test region:

34. The rod lens can be removed from the housing:

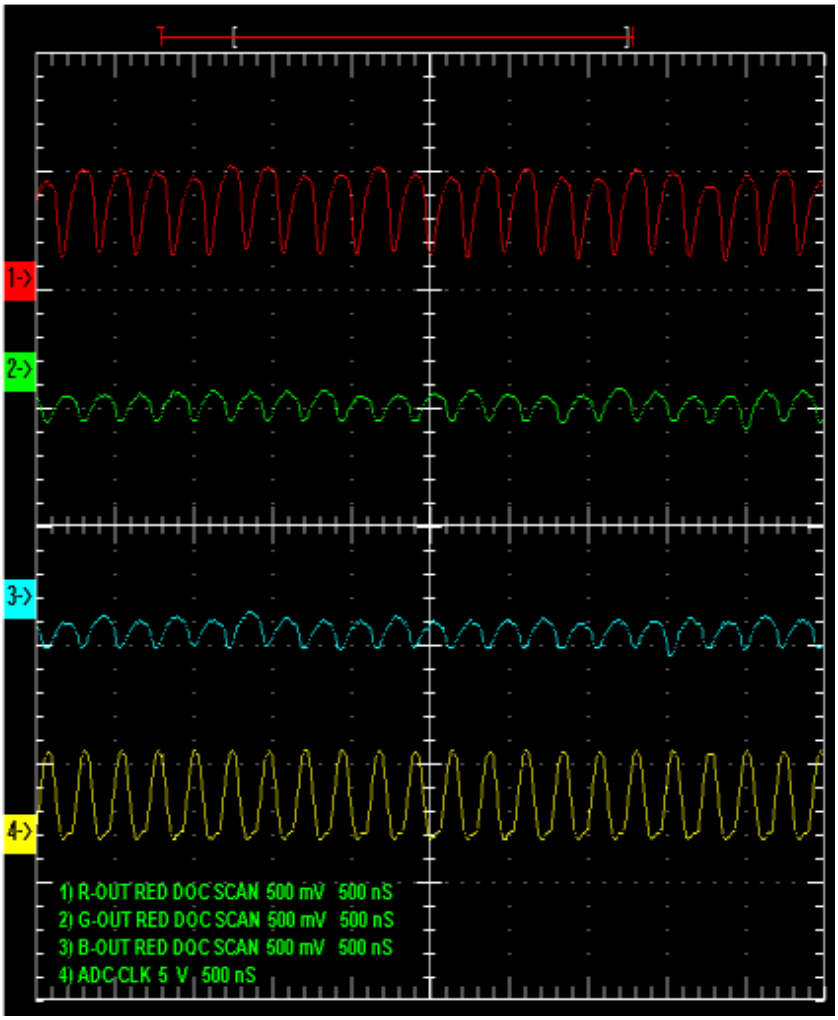
35. The MFC L6750DW includes an optical means for conveying the light reflected from the document and the test region. The housing of the CIS module includes a light guide:



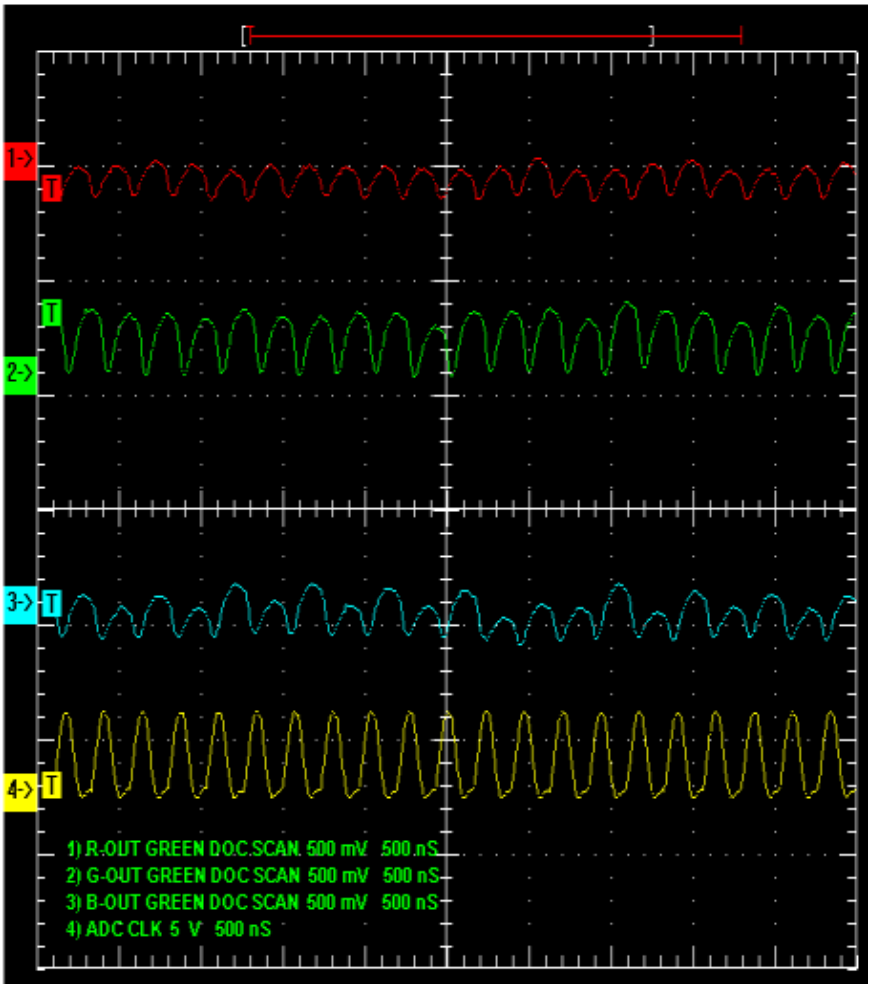
36. The MFC L6750DW includes a line image sensor for receiving light from the optical means and generating an image signal:



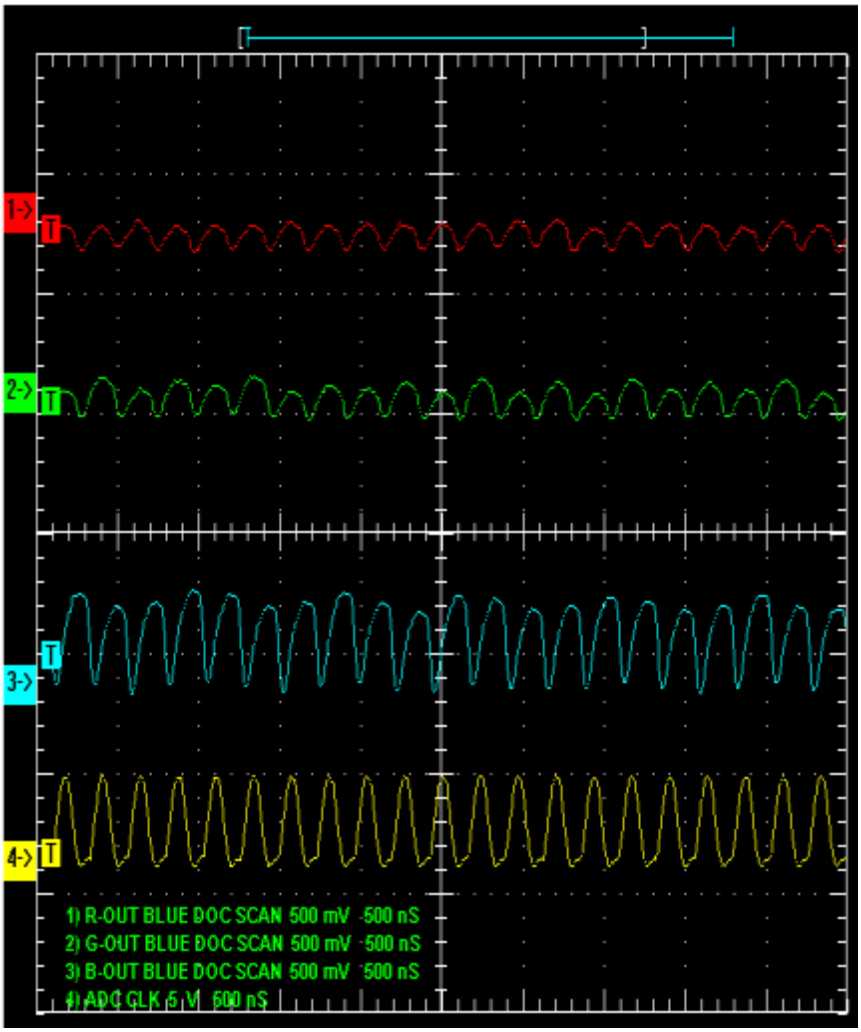
37. The image signal generated by the line image sensor corresponds to the light reflected from the document and the test region. A CIS module output from scanning a Red test pattern at the document region appears as follows:



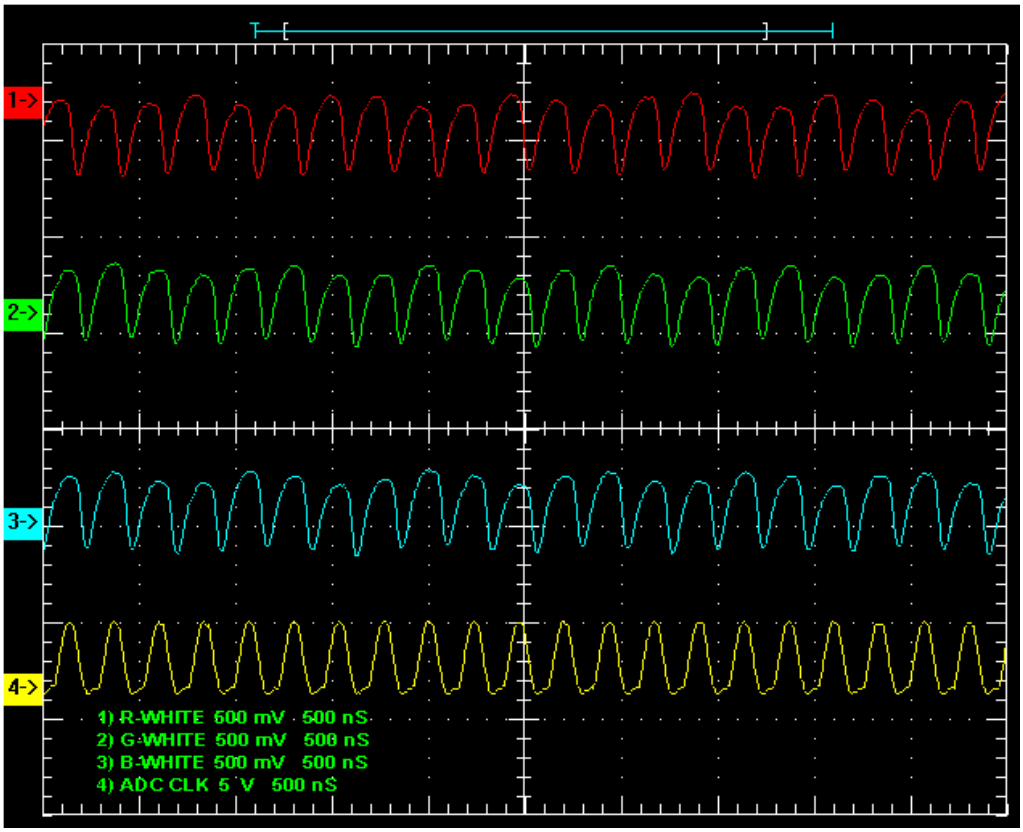
38. A CIS module output from scanning a Green test pattern at the document region appears below:



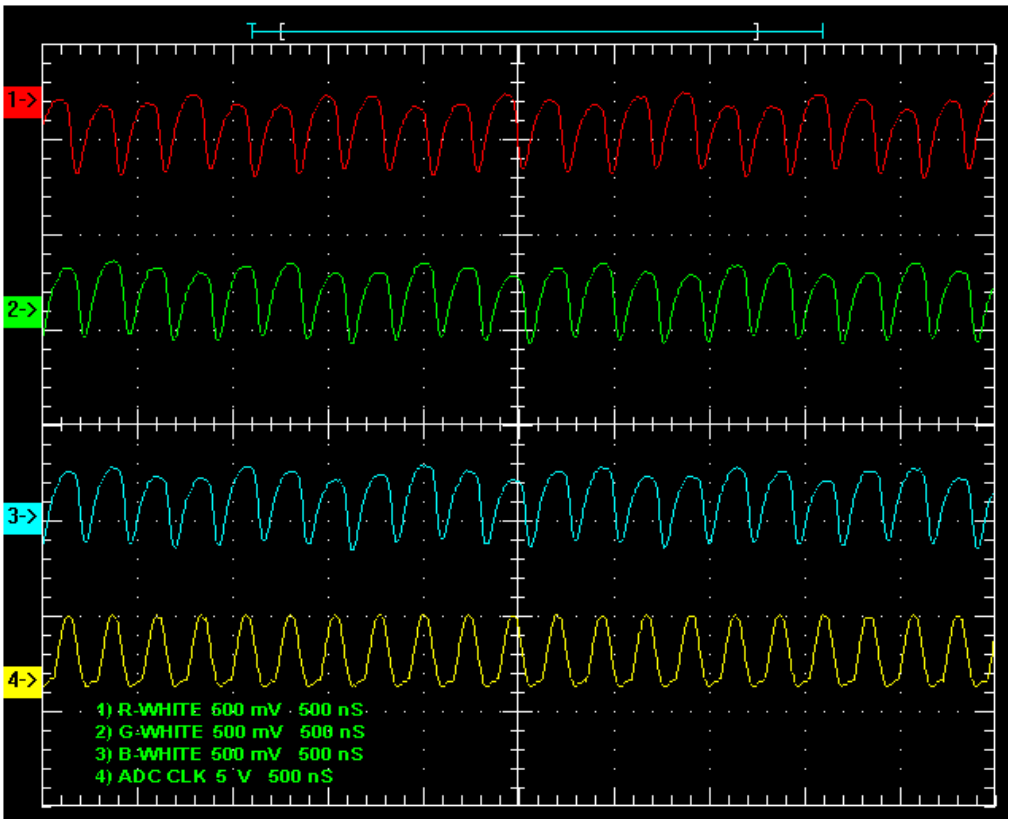
39. A CIS module output from scanning a Blue test pattern at the document region appears below:



40. A CIS module output from scanning the test region appears below:

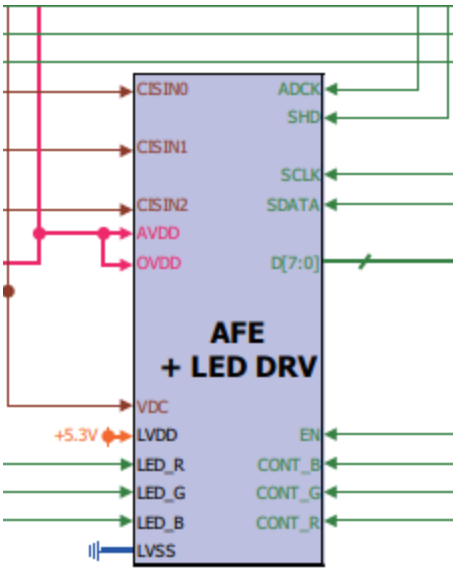


41. The line image sensor of the CIS module comprises an array of (red, green, blue) (R, G, B) sensing elements for converting the light received from the optical means into an array of corresponding (R, G, B) signals. The measured CIS module output illustrated below shows the RGB signals:



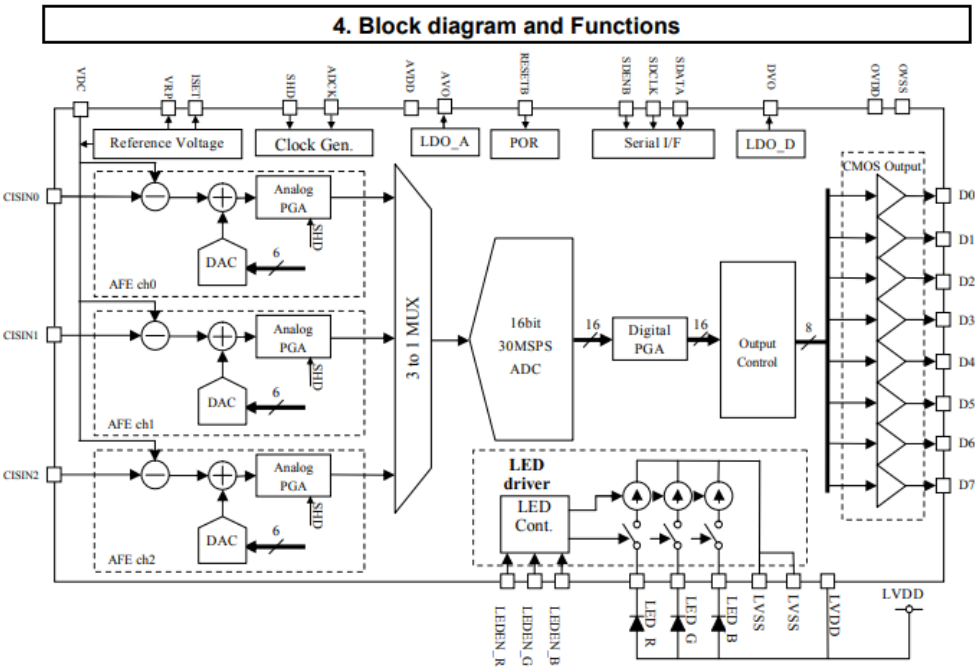
42. Both the image signal and the brightness signals generated by the line image sensor are formed by an array of RGB signals. As shown above, the image and brightness signals generated by the line image sensor of the MFC L6750DW include isolatable signals from the RGB signal array.

43. The MFC L6750DW includes a signal compensation circuit for amplifying the image signals according to the brightness signal to compensate the instability of the light source:



Service Manual at p. 6-1.

44. The Asahi Kasei AK8456 3 channel input 16-bit 30MSPS Video ADC with LED Driver is a 16-bit analogue front end/digitizer IC which processes and digitizes the analogue output signals from Contact Image Sensors.



AK8456 at p. 3 (available at https://www.akm.com/akm/en/file/datasheet/AK8456.pdf (last accessed Apr. 23, 2018)).

45. The signal compensation circuit includes a A/D (i.e. analog to digital) converter (i.e. ADC) for digitizing the RGB signals of the image signal and the brightness signal.

> ■ ADC
>
> After offset adjust, the ADC convert analog signal level to digital data. The ADC has 16-bit resolution and 30MSPS maximum conversion ratio. The output code is straight binary, 0000h corresponds to black signal and FFFFh corresponds to white signal.

Id. at p. 4.

46. The signal compensation circuit includes a digital processor (e.g. Programmable Gain Amplifier) for adjusting the digitized RGB signals of the image signal according to the digitized RGB signals of the brightness signal.

> ■ Digital PGA
>
> The digital PGA amplifies A/D data. Its gain range is 0dB~18dB and gain resolution is 8bit.

Id.

47. Thus, the MFC L6750DW includes every element of Claim 1 of the '432 Patent.

48. Diversified Observation is therefore entitled to recover from Brother the damages sustained by Diversified Observation as a result of Brother's infringement of the '432 patent in an amount subject to proof at trial, which, by law, cannot be less than a reasonable royalty, together with interest and costs as fixed by this Court under 35 U.S.C. §284.

JURY DEMAND

Diversified Observation hereby demands a trial by jury on all issues so triable.

PRAYER FOR RELIEF

WHEREFORE, Diversified Observation requests that this Court enter judgment against Brother as follows:

A. An adjudication that Brother has infringed the '461 and '432 patents;

B. An award of damages to be paid by Brother adequate to compensate Diversified Observation for Brother's past infringement of the '461 and '432 patents and any continuing or future infringement through the date such judgment is entered, including interest, costs, expenses and an accounting of all infringing acts including, but not limited to, those acts not presented at trial;

C. A declaration that this case is exceptional under 35 U.S.C. § 285, and an award of Diversified Observation's reasonable attorneys' fees; and

D. An award to Diversified Observation of such further relief at law or in equity as the Court deems just and proper.

Dated: April 23, 2018

STAMOULIS & WEINBLATT LLC

/s/ Richard C. Weinblatt

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