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Wilcken et al.

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(45) **Date of Patent: Jun. 12, 2007**

(54) **LENSLET/DETECTOR ARRAY ASSEMBLY FOR HIGH DATA RATE OPTICAL COMMUNICATIONS**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 8 days.

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(51) **Int. Cl.**
H03F 3/08 (2006.01)

(52) **U.S. Cl.** ..... **250/214 A**; 250/208.2; 398/202; 330/308

(58) **Field of Classification Search** ..... 250/214 A; 398/202; 330/308
See application file for complete search history.

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(57) **ABSTRACT**

An assembly is provided that may be used in high data rate optical communications, such as free-space communication systems. The assembly may include a main optical receiver element and a lenslet array or other optical element disposed near the focal plane that collects an optical signal and focuses that signal as a series of optical signal portions onto a photodetector array, formed of a series of InGaAs photodiodes, for example. The electrical signals from the photodetectors may be amplified using high bandwidth transimpedance amplifiers connected to a summing amplifier or circuit that produces a summed electrical signal. Alternatively, the electrical signals may be summed initially and then amplified via a transimpedance amplifier. The assembly may be used in remote optical communication systems, including free-space laser communication environments, to convert optical signals up to or above 1 Gbit/s or higher data rates into electrical signals at 1 Gbit/s or higher data rates.

25 Claims, 4 Drawing Sheets

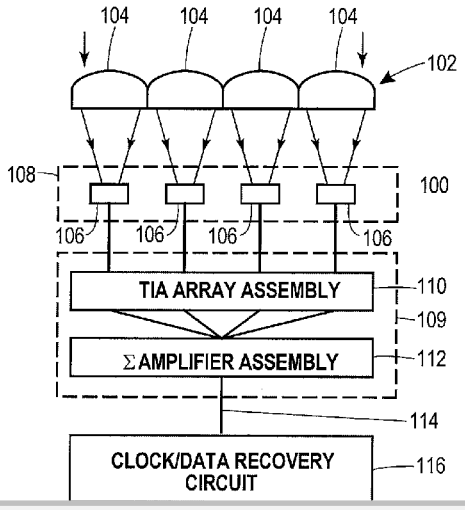

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FIG. 1

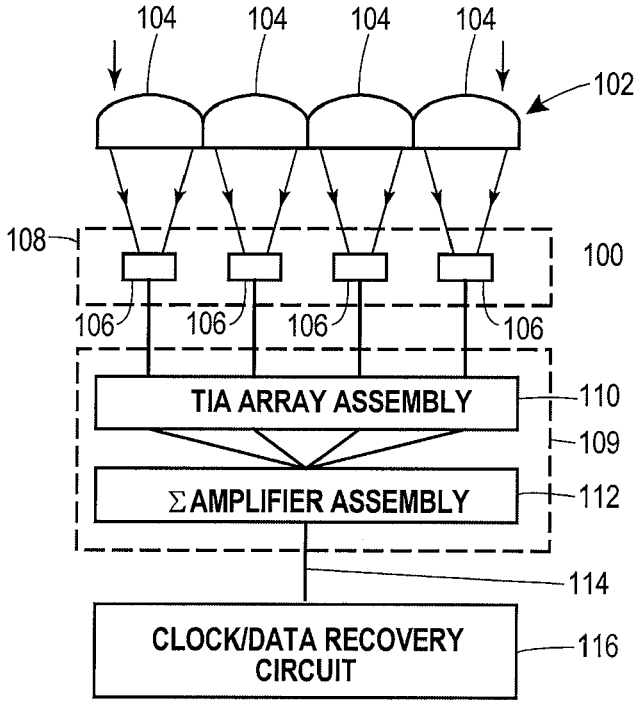

FIG. 2

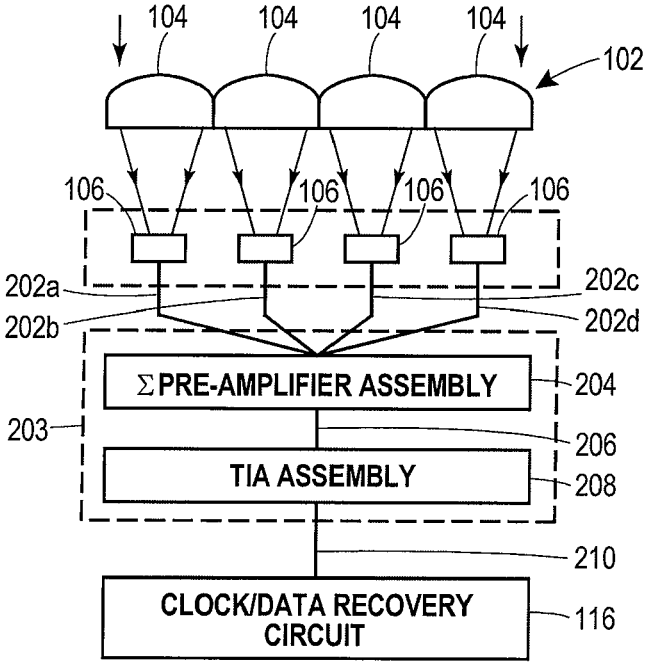

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FIG. 3

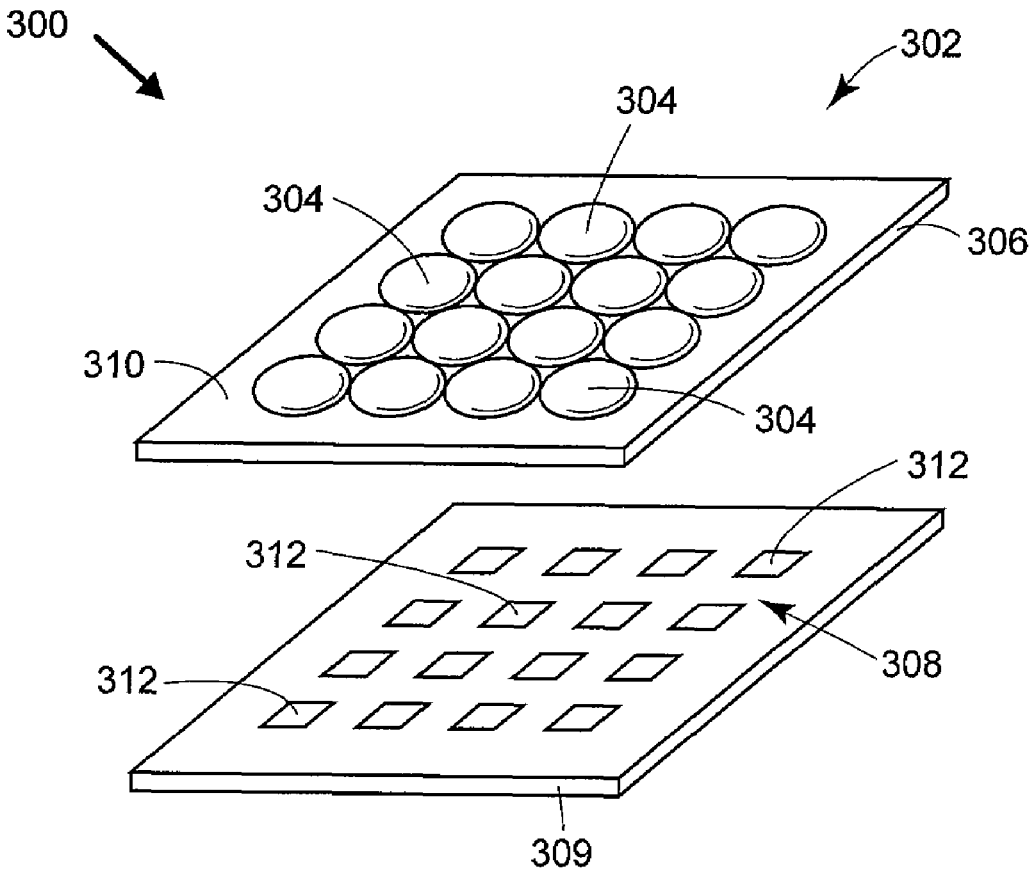

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FIG. 4

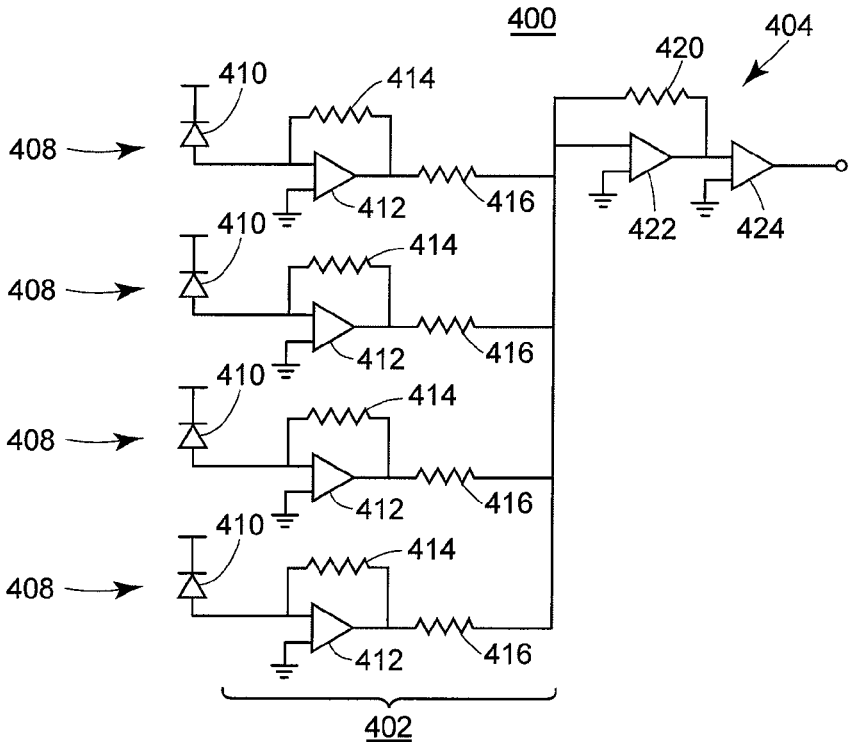


FIG. 5

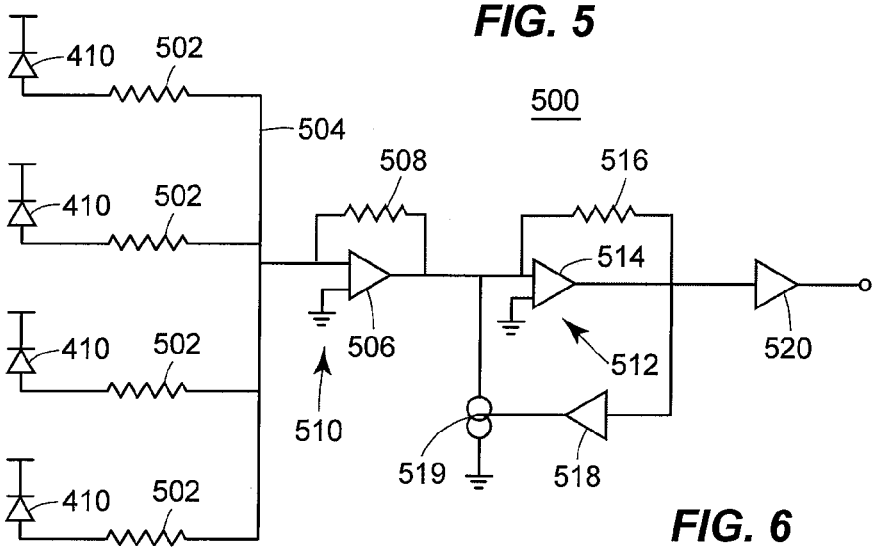
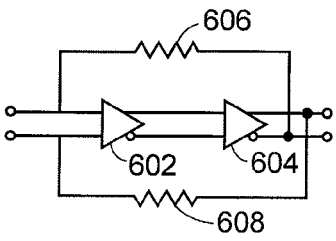


FIG. 6



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