



US 20220360270A1

(19) **United States**(12) **Patent Application Publication**
JUNG et al.(10) **Pub. No.: US 2022/0360270 A1**(43) **Pub. Date: Nov. 10, 2022**(54) **PHASE LOCKED LOOP AND OPERATING METHOD OF PHASE LOCKED LOOP**(71) Applicant: **SAMSUNG ELECTRONICS CO., LTD.**, SUWON-SI (KR)(72) Inventors: **SANGDON JUNG**, YONGIN-SI (KR);
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May 10, 2021 (KR) 10-2021-0060302

Publication Classification(51) **Int. Cl.**
H03L 7/10 (2006.01)
H03L 7/089 (2006.01)
H03L 7/099 (2006.01)(52) **U.S. Cl.**CPC **H03L 7/102** (2013.01); **H03L 7/0891**
(2013.01); **H03L 7/099** (2013.01)

(57)

ABSTRACT

A phase locked loop includes a phase detector outputting a first signal corresponding to a phase difference of a reference frequency signal and a division frequency signal, a charge pump amplifying a first signal to output a second signal, a loop filter filtering the second signal to output a third signal, a voltage-to-current converter receiving the third signal and outputting a fourth signal, a digital-to-analog converter outputting a fifth signal based on the fourth signal and a digital compensation signal, an oscillator outputting an output frequency signal having a frequency corresponding to the fifth signal, a divider dividing the frequency of the output frequency signal to output the division frequency signal and a compensation frequency signal, and an automatic frequency calibrator compensating for the voltage-to-current converter based on a difference between a frequency of the compensation frequency signal and a frequency of a reference frequency signal.

