



US 20230231566A1

(19) **United States**

(12) **Patent Application Publication**  
**Olieman et al.**

(10) **Pub. No.: US 2023/0231566 A1**

(43) **Pub. Date: Jul. 20, 2023**

(54) **TIMING CALIBRATION TECHNIQUE FOR  
RADIO FREQUENCY DIGITAL-TO-ANALOG  
CONVERTER**

(71) Applicant: **NXP B.V.**, Eindhoven (NL)

(72) Inventors: **Erik Olieman**, Waalre (NL); **Rene  
Verlinden**, Geldern (DE); **Helmut  
Kranabenter**, Graz (AT)

(21) Appl. No.: **17/577,501**

(22) Filed: **Jan. 18, 2022**

**Publication Classification**

(51) **Int. Cl.**  
**H03M 1/10** (2006.01)

(52) **U.S. Cl.**  
CPC ..... **H03M 1/1014** (2013.01)

(57) **ABSTRACT**

A calibration system comprises an actuator circuit comprising a first delay circuit that receives a plurality of data pulses and a second delay circuit that receives the pulses, wherein one of the first and second delay circuits delays the data pulses independently of the other of the first and second delay circuits; a data switch that receives an output of the actuator circuit including delay data signals of the data pulses from the first and second delay circuits and switches and outputs a plurality of local oscillator (LO) signals for output as a controlled LO signal according to control signals of the delay data signals and applied to the data switch. At least one calibration switch receives the output of the actuator circuit and the plurality of LO+ and LO- signals, and outputs a second controlled LO signal output to a sense circuit.

