

PATENT SPECIFICATION

(11)

1 486 220

1 486 220

(21) Application No. 37766/74 (22) Filed 29 Aug. 1974

(23) Complete Specification filed 19 Aug. 1975

(44) Complete Specification published 21 Sept. 1977

(51) INT. CL.² H03B 5/12 5/36

(52) Index at acceptance
H3T 1G3X 2C 2P 2T3F 3J 4D

(72) Inventors RICHARD THOMAS WRIGLEY
ANTHONY CHARLES HUCKFIELD



(54) OSCILLATOR CIRCUIT

(71) We, STANDARD TELEPHONES AND CABLES LIMITED, a British Company, of 190 Strand, London, W.C.2., England, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to electrical oscillator circuits, and in particular to oscillators in which the active element is a CMOS device.

According to the invention there is provided an oscillator circuit whose active element is a linear amplifier formed by a complementary metal oxide silicon (CMOS) gate or CMOS inverter so biased as to act as a linear amplifier, a resistive feedback loop coupled between the input and the output of the amplifier, and a frequency determining inductive-capacitive feedback loop adapted to provide positive feedback from the output to the input of the amplifier at the oscillator frequency.

An embodiment of the invention will now be described with reference to the accompanying drawing which shows an oscillator arrangement employing a CMOS device as the active element.

The circuit includes an amplifier IC1a, a frequency determining feedback network comprising inductor L and capacitors C1, C2, and C4, and an output buffer IC1b. The amplifier and the buffer may advantageously be contained in a single integrated circuit package.

IC1a is a CMOS NOR or NAND gate or an inverting element which is biased via resistor R1 connected between the input and the output of the gate. The output buffer circuit IC1b is also a CMOS NOR or NAND gate or CMOS inverting element. Both CMOS inverters or gates are operated within their linear range.

The oscillator circuit has particular application in push-button telephone subsets or other apparatus which employs CMOS circuitry. For example the circuit may be employed as a tone generator, a waveform generator or a clock oscillator. In some applications the resistor R2 and the capacitor C2 may be omitted from the circuit.

WHAT WE CLAIM IS:—

1. An oscillator circuit whose active element is a linear amplifier formed by a complementary metal oxide silicon (CMOS) gate or CMOS inverter so biased as to act as a linear amplifier, a resistive feedback loop coupled between the input and the output of the amplifier, and a frequency determining inductive-capacitive feedback loop adapted to provide positive feedback from the output to the input of the amplifier at the oscillator frequency.

2. An oscillator circuit as claimed in claim 1, and wherein an output buffer for the oscillator has its input connected to an output from the linear amplifier of the oscillator, and wherein the output buffer is formed by a CMOS gate or CMOS inverter biased so that it acts as a linear amplifier.

3. A circuit as claimed in claim 1, and in which the first and second CMOS gates or CMOS inverters are contained in a single integrated circuit package.

4. An oscillator circuit substantially as described herein with reference to the drawing accompanying the Provisional Specification.

5. A telephone subset when fitted with one or more oscillator circuits as claimed in any one of the preceding claims.

S. R. CAPSEY,
Chartered Patent Agent,
For the Applicants.

PATENT SPECIFICATION

(11)

1 486 220

1 486 220

- (21) Application No. 37766/74 (22) Filed 29 Aug. 1974
(23) Complete Specification filed 19 Aug. 1975
(44) Complete Specification published 21 Sept. 1977
(51) INT. CL.² H03B 5/12 5/36
(52) Index at acceptance
H3T 1G3X 2C 2P 2T3F 3J 4D
(72) Inventors RICHARD THOMAS WRIGLEY
ANTHONY CHARLES HUCKFIELD



(54) OSCILLATOR CIRCUIT

(71) We, STANDARD TELEPHONES AND CABLES LIMITED, a British Company, of 190 Strand, London, W.C.2., England, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to electrical oscillator circuits, and in particular to oscillators in which the active element is a CMOS device.

According to the invention there is provided an oscillator circuit whose active element is a linear amplifier formed by a complementary metal oxide silicon (CMOS) gate or CMOS inverter so biased as to act as a linear amplifier, a resistive feedback loop coupled between the input and the output of the amplifier, and a frequency determining inductive-capacitive feedback loop adapted to provide positive feedback from the output to the input of the amplifier at the oscillator frequency.

An embodiment of the invention will now be described with reference to the accompanying drawing which shows an oscillator arrangement employing a CMOS device as the active element.

The circuit includes an amplifier IC1a, a frequency determining feedback network comprising inductor L and capacitors C1, C2, and C4, and an output buffer IC1b. The amplifier and the buffer may advantageously be contained in a single integrated circuit package.

IC1a is a CMOS NOR or NAND gate or an inverting element which is biased via resistor R1 connected between the input and the output of the gate. The output buffer circuit IC1b is also a CMOS NOR or NAND gate or CMOS inverting element. Both CMOS inverters or gates are operated within their linear range.

The oscillator circuit has particular application in push-button telephone subsets or other apparatus which employs CMOS circuitry. For example the circuit may be employed as a tone generator, a waveform generator or a clock oscillator. In some applications the resistor R2 and the capacitor C2 may be omitted from the circuit.

WHAT WE CLAIM IS:—

1. An oscillator circuit whose active element is a linear amplifier formed by a complementary metal oxide silicon (CMOS) gate or CMOS inverter so biased as to act as a linear amplifier, a resistive feedback loop coupled between the input and the output of the amplifier, and a frequency determining inductive-capacitive feedback loop adapted to provide positive feedback from the output to the input of the amplifier at the oscillator frequency.

2. An oscillator circuit as claimed in claim 1, and wherein an output buffer for the oscillator has its input connected to an output from the linear amplifier of the oscillator, and wherein the output buffer is formed by a CMOS gate or CMOS inverter biased so that it acts as a linear amplifier.

3. A circuit as claimed in claim 1, and in which the first and second CMOS gates or CMOS inverters are contained in a single integrated circuit package.

4. An oscillator circuit substantially as described herein with reference to the drawing accompanying the Provisional Specification.

5. A telephone subset when fitted with one or more oscillator circuits as claimed in any one of the preceding claims.

S. R. CAPSEY,
Chartered Patent Agent,
For the Applicants.

