



Circuit arrangement comprising a tuner and a splitter-modulator.

The invention relates to a circuit arrangement comprising a tuner and a splitter-modulator comprising a splitter and a modulator.

Conventional tuners and splitter-modulators require a crystal oscillator as a frequency reference. A circuit arrangement which comprises both a tuner and a splitter-modulator, as is preferably the case in RF processing stages in video recorders, should thus
5 comprise two quartz crystals, which requires a large number of components.

It is an object of the invention to reduce the number of components for a circuit arrangement which comprises both a tuner and a splitter-modulator.

According to the invention, this object is solved by a circuit arrangement
10 comprising a tuner and a splitter-modulator comprising a splitter and a modulator, in which the splitter has an RF signal input for applying an RF input signal, an RF signal output for supplying an RF output signal, a first line for applying the RF input signal to the tuner and a second line for supplying an RF output signal from the modulator, the tuner being adapted to demodulate the RF input signal and the modulator being adapted to convert a baseband signal
15 into the RF output signal to be supplied by said modulator, and comprising devices for generating reference oscillations for the tuner and the splitter-modulator, said devices having at least one quartz crystal which is common for the tuner and the splitter-modulator.

To reduce the number of components, the invention provides the
possibility of deriving the frequency reference for the tuner and the splitter-modulator from a
20 single quartz crystal or crystal oscillator. One crystal oscillator can then be dispensed with. The sole crystal oscillator can then feed a synthesizer in the tuner and in the splitter-modulator. Particularly, the quartz crystal or crystal oscillator of the tuner is also utilized by the splitter-modulator. Instead of the separate crystal oscillator, a transistor coupling stage, for example, a phase-locked loop, may preferably be inserted in the splitter-modulator
25 between the quartz crystal of the tuner and the synthesizer of the splitter-modulator. The reference oscillations as well as their low-ohmic coupling into the synthesizer of the splitter-modulator can be amplified by this transistor coupling stage.

In an advantageous embodiment of the invention, the devices for generating reference oscillations comprise a phase-locked loop which is common for the



tuner and the splitter-modulator. In this embodiment, the number of components is further reduced in that only a single, common synthesizer is used for the tuner and splitter-modulator which are combined to one group. For this purpose, only one quartz crystal, only one phase-locked loop and only one oscillator stage are required.

5 These and other aspects of the invention will be apparent from and elucidated with reference to the embodiments described hereinafter.

 In the drawings:

 Fig. 1 shows a first embodiment of a combination of a tuner and a splitter-modulator with a common quartz crystal, and

10 Fig. 2 shows such a combination with a common quartz crystal and a common synthesizer.

 Corresponding elements are denoted by the same reference numerals.

 Fig. 1 shows a combination of a tuner 1, a modulator 2 and a splitter 3, in which modulator 2 and splitter 3 are combined to form a splitter-modulator. An RF input
15 signal, for example a television signal can be applied from an antenna to the splitter 3 *via* an RF signal input 4. This signal is applied *via* a first preamplifier 5 to a first signal splitter 6 and from this splitter to a first line 7, and to a second signal splitter 9 *via* a second preamplifier 8. The signal can be supplied from this splitter *via* an RF signal output 10.

 The RF input signal is applied through the first line 7 to the tuner 1 in
20 which a frequency selection 11, an amplitude control 12 and a down-conversion 13 are customarily performed by stages which are conventionally used for this purpose. An IF signal is supplied *via* an output amplifier 14. Reference oscillations from a synthesizer associated with the tuner 1 and comprising a phase-locked loop 15 and an oscillator stage 16 are applied in conventional manner to frequency selection stage 11 and down-conversion
25 stage 13. The phase-locked loop 15 is controllable *via* control lines 17, preferably an I2C bus, for the purpose of tuning the tuner 1.

 The modulator 2 comprises a known audio signal modulator 18, an audio signal input 19 of which can receive an audio baseband signal which is modulated on a sound carrier oscillation. The modulated audio signal is superimposed in a superposition stage 20
30 on a video baseband signal supplied *via* a video signal input 21. The combined baseband signal thus obtained is modulated on an RF carrier oscillation in a baseband signal modulator stage 22, which oscillation is generated in a synthesizer of the modulator 2, which synthesizer comprises a second phase-locked loop 23 and a second oscillator stage 24. In principle, the synthesizer 23, 24 of the modulator 2 has the same structure as that of the

tuner 1. Particularly, both synthesizers 15, 16 and 23, 24 are controlled by a single quartz crystal, while a transistor coupling stage 26 for amplifying the oscillation and low-ohmic coupling may be arranged between the quartz crystal 25 and the second phase-locked loop 23.

5 A second line 27 supplies the RF output signal of the modulator 2 from the baseband signal modulator stage 22 to the second signal splitter 9 of the splitter 3, via which it reaches the RF signal output 10.

In the embodiment of Fig. 2, which is otherwise identical to that shown in Fig. 1, the second phase-locked loop 23 and the second oscillator stage 24, i.e. the separate
10 synthesizer of the modulator 2, have been omitted. The baseband signal modulator stage 22 of the modulator 2 is directly fed from the oscillator stage 16 of the synthesizer of the tuner 1.

These circuit arrangements are preferably used in RF processing stages of video recorders.



CLAIMS:

1. A circuit arrangement comprising a tuner and a splitter-modulator comprising a splitter and a modulator, the splitter having an RF signal input for applying an RF input signal, an RF signal output for supplying an RF output signal, a first line for applying the RF input signal to the tuner and a second line for supplying an RF output signal from the modulator, the tuner being adapted to demodulate the RF input signal and the modulator being adapted to convert a baseband signal into the RF output signal to be supplied by said modulator, and comprising devices for generating reference oscillations for the tuner and the splitter-modulator, said devices having at least one quartz crystal which is common for the tuner and the splitter-modulator.
- 10 2. A circuit arrangement as claimed in Claim 1, characterized in that the devices for generating reference oscillations comprise a phase-locked loop which is common for the tuner and the splitter-modulator.

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