AUDIO ENCODER UN17/507

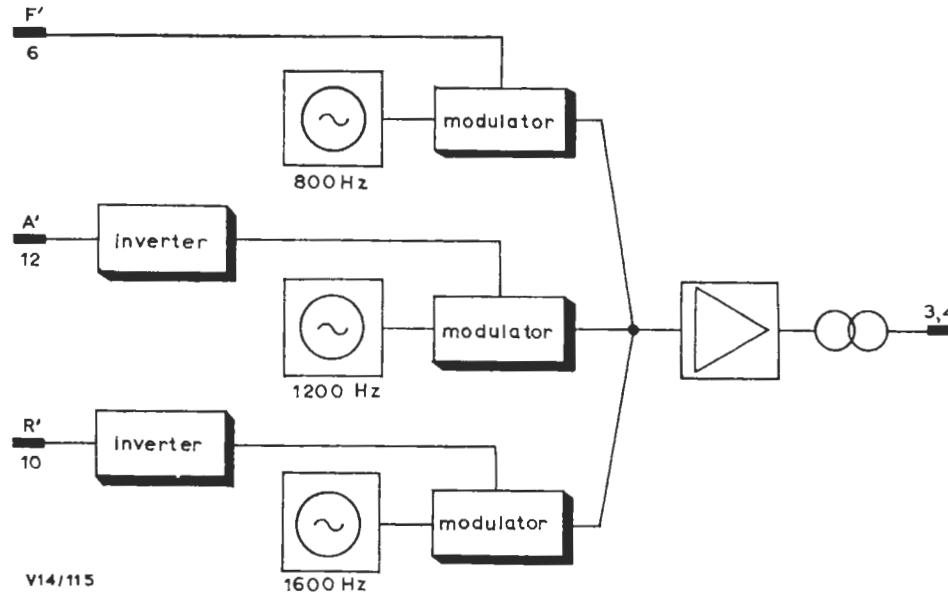

Fig. 1 Block Diagram of the UN17/507

Introduction

The Audio Encoder UN17/507 converts d.c. error signals into audio tones for transmission over a low-grade audio circuit; see also GE1/523 and the Natlock system described in Instruction V.1.

The UN17/507 is constructed on a CH1/26A chassis with index peg positions 13 and 22.

General Description

Fig. 1 shows a block diagram of a UN17/507. The error-signal inputs are used to modulate the outputs of three oscillators. Two of the error signals, R′ and A′, are inverted before being applied to the modulator transistors. This ensures that there will be an output from the Encoder under all normal operating conditions. The tones are mixed and fed to a conventional output amplifier.

Circuit Description

The circuit of the encoder is given in Fig. 2. The input signals may have one of two values; although these values are nominally 0 and −6 volts they may vary over the ranges 0 to −1·0 volts and −4·5 volts to −6 volts respectively. The emitters of the inverting transistors TR1 and TR2 are biased to accommodate the range of values of the input signals.

The frequencies of the complementary-amplifier Wien-bridge oscillators are 800 Hz (F′), 1200 Hz (R′) and 1600 Hz (A′)

The modulator transistors TR12 to TR14 are used as switching transistors.

Test Schedule

Apparatus Required

Avometer Model 8.
A.C. Test Meter ATM/1.
Power Supplies:
12 volts at 50 mA
6 volts at 5 mA
0 — 6 volts at 5 mA

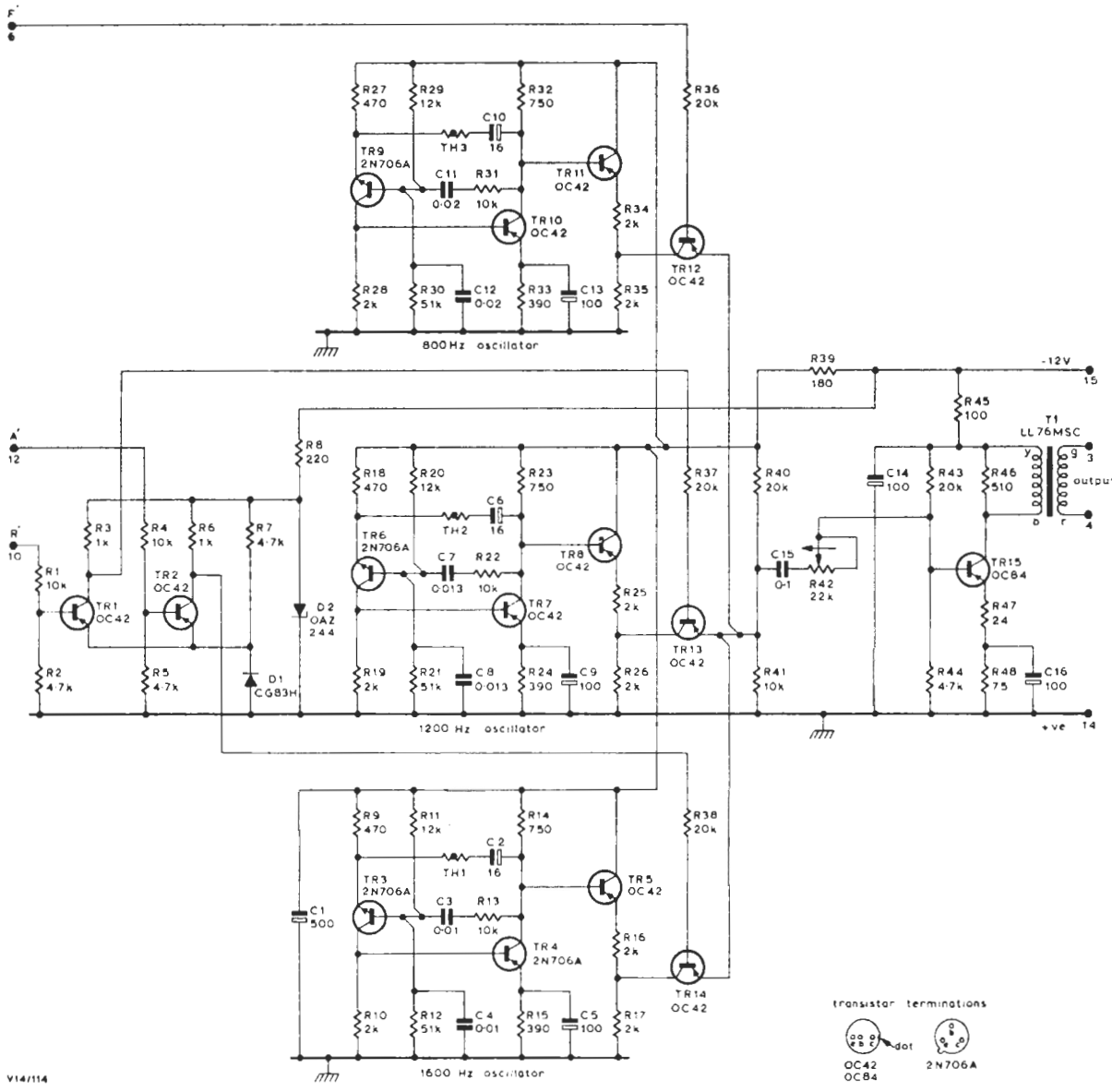

Fig. 2 Circuit of the UN17/507

Test Procedure

1. Connect the 12-volt power supply as shown in Fig. 2.
2. Observe the waveforms at the emitters of transistors TR5, TR8 and TR11. Their amplitudes should be 3·5 ± 0·3 volts p-p and their frequencies within 40 Hz of their nominal values.
   An unusually high-gain transistor in the positions TR4, TR7 or TR10 may cause the frequency to be outside this limit. A 10 per cent increase in the values of resistors R13, R22 or R31 decreases the frequency of the oscillator by 5 per cent.
3. Connect the output of the Encoder to the terminated input of the A.C. Test Meter.
   Apply −6 volts to pins 10 and 12.
   Apply 0 volts to pin 6.
   The output of the Encoder should be less than −55 dB.
4. Reconnect pin 10 to 0 volts and adjust the variable resistor R42 so that the output from the encoder is 1200-Hz tone at zero level.
5. Reconnect pin 10 to the variable −6 volts supply and reduce the voltage to zero. Note the voltages at which the output level of the Encoder is −40 dB and 0 dB. These voltages should be more positive than −4·5 volts and more negative than −1·0 volts respectively.
6. Reconnect pin 10 to the fixed −6 volts supply and pin 12 to the variable −6 volts supply. Reduce the variable voltage to zero noting the voltages at which the output level of the encoder is −40 dB and at which it no longer increases. These voltages should be more positive than −4·5 volts and more negative than −1·0 volts. The maximum output level of 1600-Hz tone from the encoder should be 0 ± 2 dB.
7. Reconnect pin 12 to the fixed −6 volts supply and pin 6 to the variable supply set at 0 volts. Increase the voltage applied to pin 6 and note the voltages at which the output of the Encoder is −40 dB and at which it no longer increases. These voltages should be more positive than −4·5 volts and more negative than −1·0 volts. The maximum output level of 800-Hz tone from the encoder should be 0 ± 2 dB.

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