

FREQUENCY MODULATOR MD3/501

Introduction

The MD3/501 is a frequency modulator which accepts an audio signal and produces a 6MHz frequency modulated output with correct pre-emphasis. With suitable associated equipment^{1,2} the centre frequency of the f.m. signal may be locked to a reference source.

The unit is mounted in a CH1/12B chassis with index pegs 11 and 25; it has been designed as part of the MD1/502 Wide Band Sound and Vision Modulator.

General Specification

Modulation Input

Level

(for 50 kHz deviation at 400 Hz) +8 dB \pm 0.5 dB

Modulation Input Impedance 600 ohms balanced

Output Level (6 MHz f.m.)

PLA7 terminated with 75 ohms 0.7 V to 1.0 V p-p

PLA9 terminated with 75 ohms greater than 2 V p-p

Distortion at 75 kHz Deviation

100 Hz -46 dB

1 kHz -54 dB

Pre-emphasis 50 μ s

Noise Level (peak noise relative to demodulated output at 75 kHz deviation) -60 dB

Circuit Description

The circuit diagram is given in Fig. 1. TR1 is

the oscillator in a transformer-coupled circuit. The modulation is applied to the base via a pre-emphasis circuit and in series with the r.f. feedback coil. TR2, besides providing a convenient high impedance point for feeding in the locking signal, also helps to stabilise the emitter current of TR1 against temperature variations. The output from TR1 is passed by the r.f. amplifier TR3/TR4, to a low pass filter with cut-off frequency at 9.6 MHz. This removes unwanted products from the signal which then passes to a splitting pad with two outputs, one of which feeds the associated apparatus¹ producing the locking signal.

The complete circuit, with the exception of the pre-emphasis and filter boards, is mounted inside a temperature controlled oven.

Maintenance

Routine maintenance is not required but the following performance checks can be made occasionally.

1. The response of the pre-emphasis filter should conform to the curve of Fig. 2 to within \pm 0.5 dB up to 10 kHz and \pm 1 dB from 10 kHz to 20 kHz.
2. With C5 in its mid position, the output frequency measured at PLA7 should be 6 MHz. For this test the unit must have reached its operating temperature, i.e., about one hour after switch-on.
3. The input level for \pm 50 kHz deviation should be +8 \pm 0.5 dB above zero level at 400 Hz. The pad R7, R8, R9 is adjusted to give this condition.

References

1. Discriminator UN15/501.
2. Frequency Converter CO2/510.
3. Designs Department Specification No. 3.23(65).
AIB 6/70

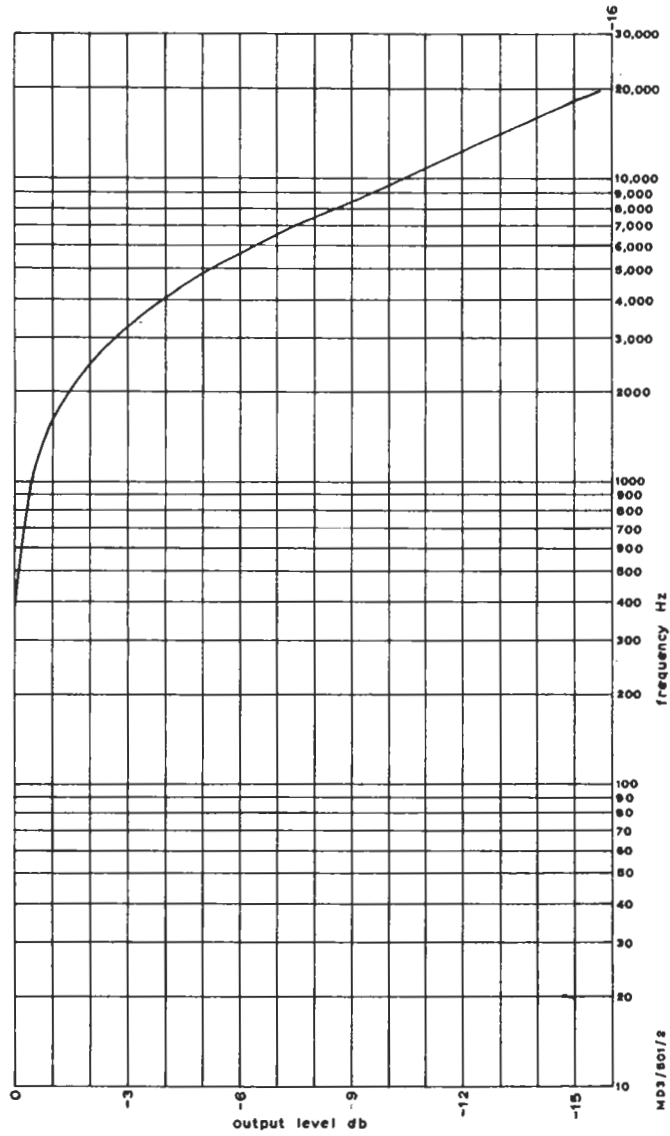


Fig. 2 Response of Pre-emphasis Filter in MD3/501

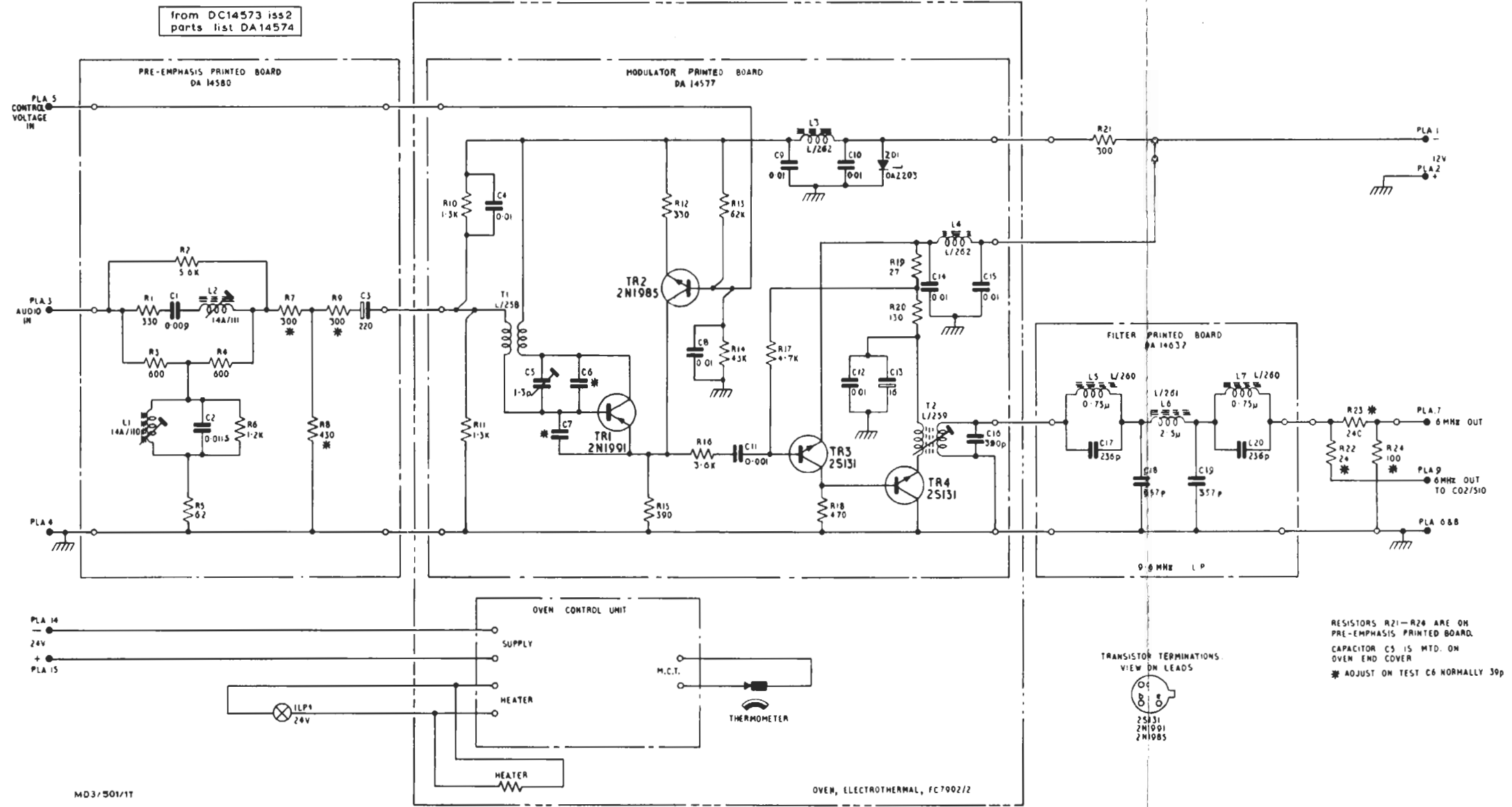


Fig 1 Frequency-modulator MD3/501