VARIABLE INDUCTANCE FREQUENCY MODULATOR MD3/3

The MD3/3 accepts either a monophonic or coded stereophonic input signal, and produces a frequency-modulated output centred on 10·7 MHz. The unit is built on a CH1/12A chassis with index pegs at positions 31 and 37.

The stability of the variable-inductance oscillator is adequate without the use of a temperature controlled oven, although it is surrounded by thermal insulation.

General Specification

Modulation Frequency	30 Hz - 53 kHz
Input Impedance	75 or 600 ohms unbalanced
Input Level for ±75 kHz Deviation	75 ohms: 400 mV p–p ±10% 600 ohms: –3·5 dB ±1 dB
Output Centre Frequency	10·7 MHz
Output Level	50 mV r.m.s. when terminated by 50 ohms
Output Impedance	50 ohms unbalanced
Power Requirement	12·0V 120 ±10 mA
Temperature Range	+2°C to 40°C.

Circuit Description (Fig. 1)

The input signal is fed through a fixed attenuator R2 R3 and R4 which is selected to suit the installation input level and impedance. With a 75-ohm input, the signal is amplified by pre-amplifier TR1 before being fed to the 0 – 5 dB attenuator R10. With a 600-ohm input, the pre-amplifier is bypassed and the signal is fed directly from the fixed to the variable attenuator.

TR2 TR3 and TR4 form a long-tailed pair phase-splitter, the outputs of which feed the bases of TR6a and TR6b in the variable-inductance modulator stage.

The modulator comprises TR5 TR6a TR6b and TR7. A centre frequency of 3 MHz is used and this is adjusted by C11, the control marked FREQUENCY on the front of the unit. The principles of this type of modulator are given in the BBC Engineering Monograph No. 76 and D.D.T.M. 12.12(67).

The 3-MHz frequency-modulated output is fed through buffer/limiter TR8 to the mixer circuit IC1, where it is mixed with the output of a 13·7-MHz crystal-oscillator X1. The mixer output is fed through amplifier TR9 and TR10 to a three section band-pass filter which selects the lower sideband.

Maintenance Notes

Listed below are typical voltage readings obtained with an oscilloscope and high-impedance probe at the front panel test sockets. The MD3/3 output is connected to a 50–ohms load.

3 MHz	30 mV p-p
13·7 MHz	90 mV p-p
10·7 MHz	80 mV p-p
MOD INPUT	Input voltage

Linearity Adjustment

Variable resistor R18, marked LINEARITY on the MD3/3 printed wiring board, is provided to set up the unit for minimum distortion. When R18 is correctly set the signal voltage at the collector of TR3 is 80 to 90 per cent of that at TR2 collector.

Frequency Response and Crosstalk Adjustment

Note: The linearity must be correctly set before checking the frequency response and stereophonic crosstalk.

The frequency response and hence the stereophonic crosstalk is controlled by capacitor C8.

References to Typical Associated Equipment

1. Frequency Converter, 10·7 MHz CO2/6
2. V.I.F.M. Drive Equipment EP7L/8.

JS 1/72

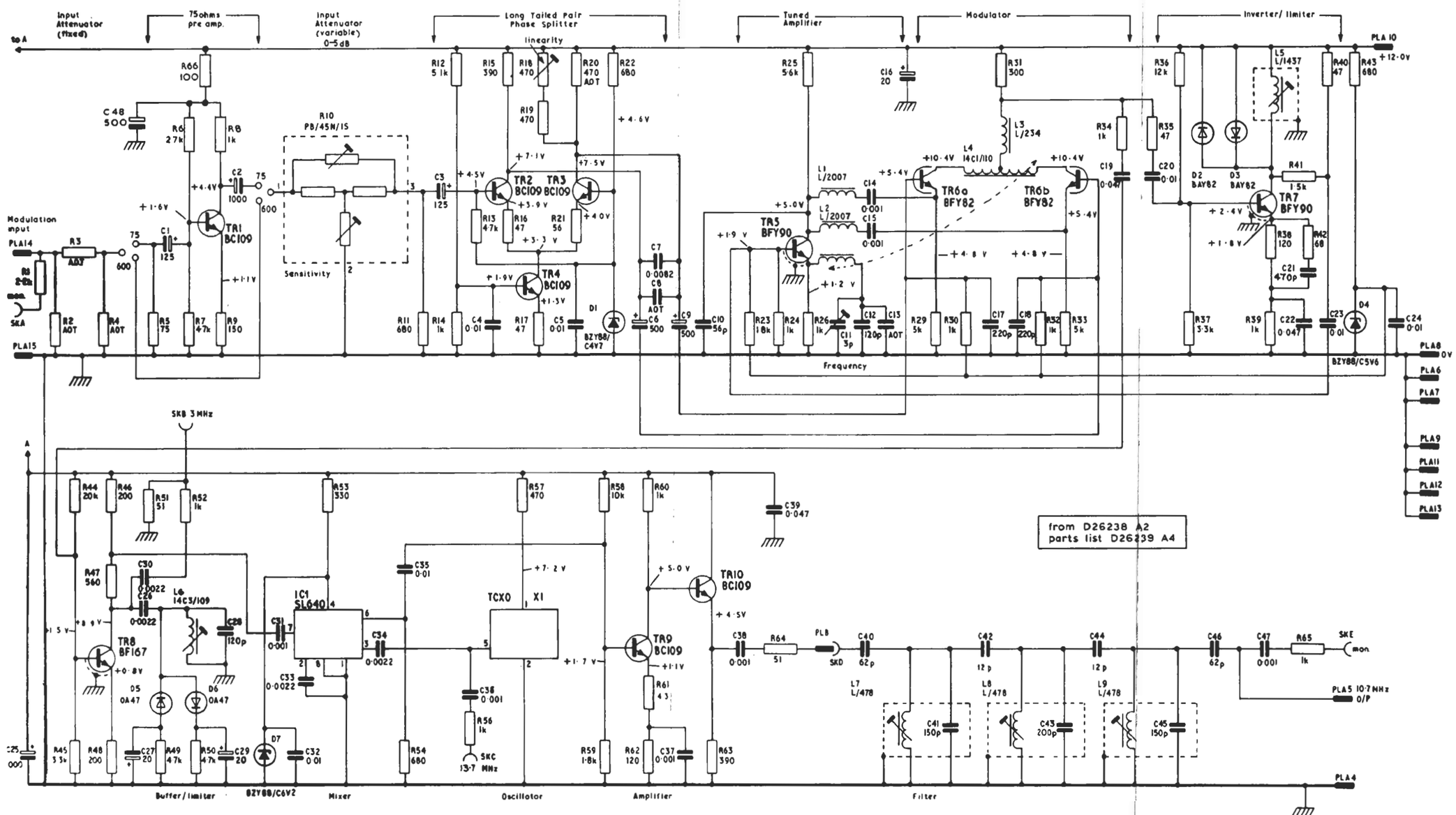

Table of input resistors

Attenuation db	600Ω		75Ω	
	R2 R4	R3	R2 R4	R3
2	5·1k	150	680	18
4	2·4k	270	330	36
6	1·8k	430	220	56
8	1·5k	620	180	75
10	1·2k	820	150	100
12	1 k	1·1k	130	130
14	910	1·5k	110	180

Integrated circuit view on top

SL640

IC1 – SL640

Pin	Voltage
2	+2·7 V
3	+2·7 V
4	+5·8 V

Transistor terminations view on leads

BC109 BFY90 BFY82 BF167

Osc. module view on tags

TCXO

Note All d.c. voltages taken on AVO model 8

MD3/3/1T

Fig. 1 Circuit of the MD3/3