LOW-PASS FILTER FL4/39

The FL4/39, see Fig.1, has a low pass characteristic with a deep notch in its response at 23 kHz. The insertion loss is approximately 0·3 dB and the attenuation at 23 kHz is about 25 dB. Above 23 kHz the attenuation is at least 12 dB. The input and output are balanced and, within the pass-band, the impedance is 600 ohms.

The filter is built on a CH1/12A chassis with index peg positions 14 and 33.

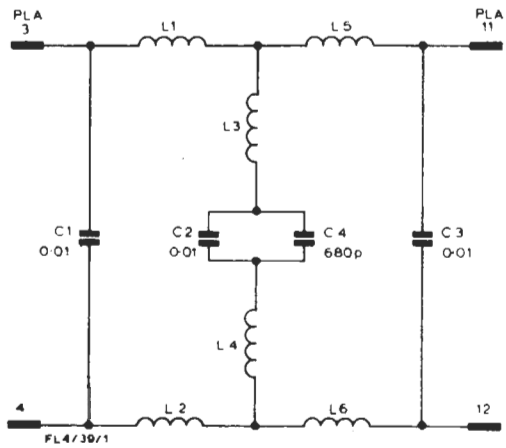

Fig. 1. Circuit of the FL4/39

output of the bridge rectifier is smoothed by R26 and C10, and applied to the stabiliser consisting of transistors TR4, TR5 and TR6, together with Zener diodes ZD3 and ZD4. Transistor TR6 is the series regulator and it forms a compound emitter-follower with TR5.

General Data

Voltage gain	AM4/507: 0 dB ± 0·1 dB AM4/508. 6 dB ± 0·1 dB
Number of outputs	3
Output level	1 V peak-to-peak in 75 Ω
Overload point	2·8 V peak-to-peak sine-wave in 75 Ω
Amplitude/frequency response	±0·1 dB from 20 c/s to 5·5 Mc/s at nominal output level with all 3 outputs terminated
Pulse and bar response (625 lines)	10 amplifiers in series will give a *K* rating of less than 1%
Input impedance	> 10 kΩ in parallel with less than 30 pF up to 5·5 Mc/s
Output impedance	| 75| Ω ±1% at 10 kc/s | 77| Ω ±1 Ω at 3 Mc/s | 78| Ω ±2 Ω at 5·5 Mc/s
Output resistance (Real part of output impedance)	> 74·5 Ω up to 5·5 Mc/s
Separation between outputs	> 60 dB at 10 kc/s > 38 dB at 3 Mc/s > 30 dB at 5·5 Mc/s
Return loss on a return signal to any output	> 30 dB up to 5·5 Mc/s
D.C. at output	±0·1 V for ambient temperature range 20° to 30° C ±0·2 V for ambient temperature range 10° to 40° C
Hum on output	< 0·5 mV peak-to-peak in 75 Ω
50-c/s square-wave response	Sag on a 50-c/s symmetrical square wave, approximately 1%
Low-frequency bump	< 14% overshoot for a d.c. step signal on the input fed through any single *CR* circuit No overshoot for a d.c. step signal on the input
Mains bump	The total signal excursion for a sudden 50-V mains change is less than 0·01 V
Non-linearity distortion	< 0·1%
Differential phase at 4·43 Mc/s	Approximately 3°
Change of gain for 50-V mains voltage change	< 0·01 dB at 3 Mc/s < 0·05 dB at 5·5 Mc/s
Operating temperature	10° to 40° C ambient
Change of gain with temperature over the range 25° to 40° C	±0·03 dB at 10 kc/s ±0·17 dB at 3 Mc/s ±0·31 dB at 5·5 Mc/s
Power requirements	200 to 250 V 50 c/s, 28 mA
Weight	2 lb 2 oz

Test Procedure

Voltages

The voltages given in the table opposite are intended as a guide for servicing and are measured relative to earth. They are the same for both amplifiers unless shown otherwise.

Apparatus Required for Alignment

Wayne Kerr video oscillator Type 022B.
Tektronix oscilloscope Type 515.
H.F. double-pole change-over box.
Connector block Type PN3A/2.
75-ohm unbalanced wide-band decibel meter, B.P.L. Type E.3233 (P.O. Type 25A).
Three 75-ohm Musa terminations.
75-ohm F. & E. termination.
75-ohm 6-dB ±1% attenuator.