

MIXING AMPLIFIER AM1/510

Introduction

The AM1/510 is intended for use with the cut-fade amplifier AM1/508; a number of cut-fade amplifiers feed into a single mixing amplifier.

The AM1/510 operates directly from the mains and has an integral power supplier. This is capable of supplying up to three cut-fade amplifiers as well as the mixing amplifier; a separate power supplier PS2/505 is required to supply additional cut-fade amplifiers.

The AM1/510 is mounted on a chassis CH1/12A. The index peg positions are 5 and 11.

General Specification

This general specification applies to the combined unit consisting of a cut-fade amplifier AM1/508 and a mixing amplifier AM1/510.

| | |
|--------------------------------------|---|
| <i>Gain</i> | 12 dB. |
| <i>Input Level</i> | 0.25 volt. |
| <i>Input Impedance</i> | 820 ohms. (Connections are provided for an additional 82-ohm resistor to make the input impedance 75 ohms.) |
| <i>Output Level</i> | |
| Main | 1 volt p-p across 75 ohms. |
| Secondary | 1 volt p-p across 75 ohms. |
| <i>Output Impedance</i> | 75 ohms. |
| <i>Frequency Response</i> | |
| Variation between 10 kHz and 7 MHz | less than 0.1 dB. |
| Pulse/bar ratio (625-line 1T and 2T) | better than 1 ± 0.2 per cent. |
| Bar distortion | less than 0.7 per cent. |
| <i>L.F. Response</i> | 50-Hz square wave distortion less than 1.5 per cent. |
| <i>Differential-phase Distortion</i> | 0.15 degrees at 4.43 MHz. |

| | |
|--------------------------------------|---|
| <i>Delay</i> | 74 ns at 4.43 MHz. |
| <i>Nonlinearity Distortion</i> | less than 0.5 per cent. |
| <i>Isolation</i> (without muting) | 80 dB at 100 kHz. 60 dB at 5 MHz. |
| <i>Hum Level</i> | less than 1 mV p-p. |
| <i>Current Consumption</i> | 60 mA at 14 volts. 32 mA at 9 volts. |
| <i>Ambient Temperature</i> | 10 to 45 degrees C. |

Circuit Description

Full circuit details of the AM1/510 are given in Fig. 1. From TR3 onward the circuit uses direct coupling and so the d.c. level at the output can be set by means of the variable resistor RV1. The collector load resistance of TR5 can be varied, thus allowing adjustment of TR5 collector current (in conjunction with RV1) to achieve minimum differential-phase distortion.

The output impedance at the emitter of TR11 is reduced by negative feedback to a value less than 1 ohm and so the output impedance of the amplifier is determined by resistor R31.

The NE1/518 networks in the Main and Secondary output circuits provide adjustable phase shift.

Maintenance

This subsection deals with the maintenance of the composite unit comprising an AM1/508 and an AM1/510.

For convenience a test connector TE2/2 should be used for connecting a single AM1/508 to an AM1/510. This connector should be fitted with chassis guides (Designs Department Drawing No. DB 15552) which prevent a chassis dowel from entering the mains socket (No. 1) of the 15-way connector.

Adjustment of the AM1/508 to eliminate d.c. bumps depends on the voltage of the d.c. supply. Thus the adjustment should be checked when the amplifiers are returned to their normal positions.

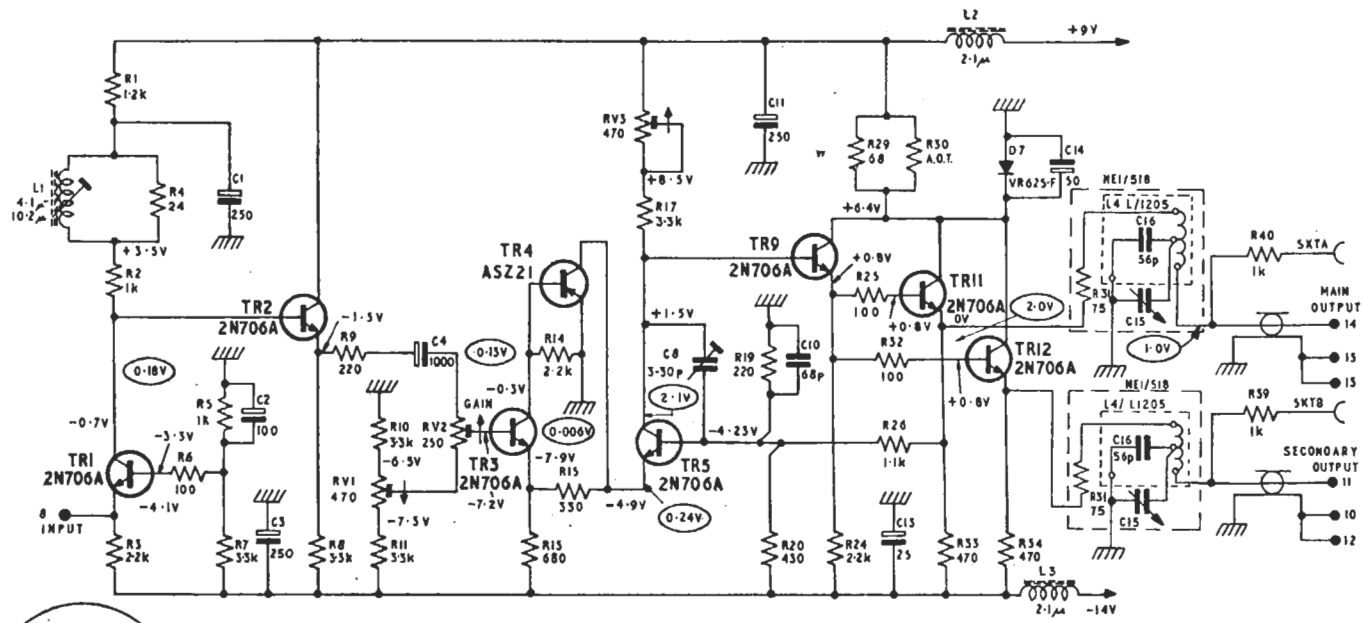
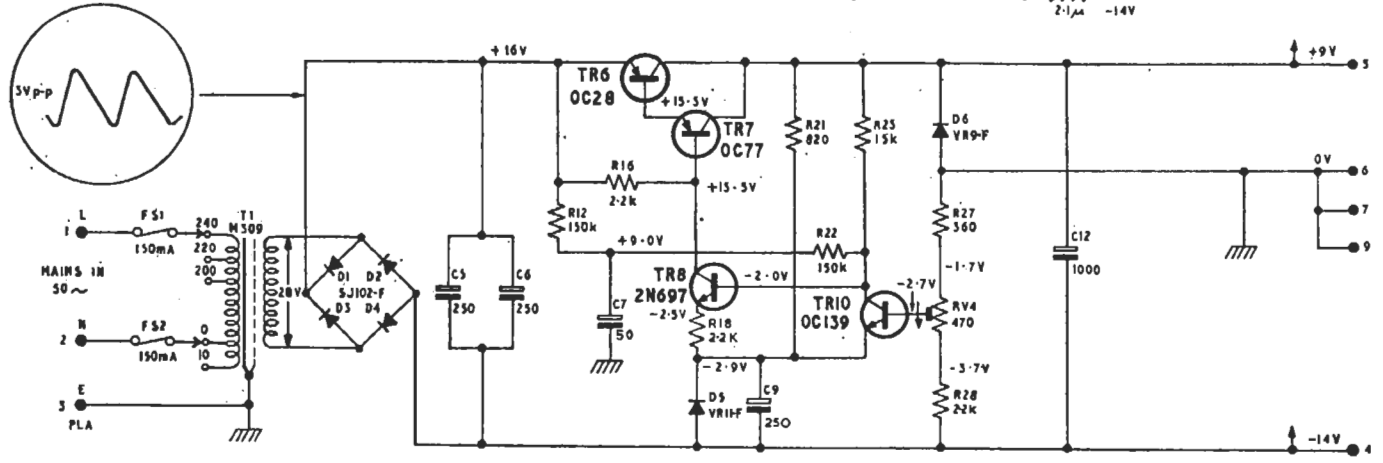


Fig. 1 Circuit of the Mixing Amplifier AM1/510



AM1/510/1

KEY:
 VOLTAGES DENOTED THUS
 +0.0V AS MEASURED ON AVO
 -14V MODEL 8
 (0.18V) d.p.p. SIGNAL VOLTAGES

TRANSISTOR TERMINATIONS
 VIEW ON LEADS
 (8 8) DOT OC159
 (8 8) ASZ21
 (8 8) 2N706A
 (8 8) 2N697
 (8 8) OC77

(8 8) C-CASE
 (8 8) OC28

from DC11661 parts list DA11662

Equipment Required

Avometer Model 8
 High-grade Oscilloscope (5 mV/cm and d.c.)
 Source of d.c. at 50 V
 Precision Variable Attenuator (75 ohms)
 625-line Pulse and Bar Generator GE4/504C
 Audio Amplifier Philips GM4574
 Amplifier Tester TE2/2
 Two 82-ohm 4.5 watt Resistors (Painton 301)
 15-way Socket Painton 316128 with the following connections:

| | |
|-------|---------------|
| Pin 1 | Mains live |
| Pin 2 | Mains neutral |
| Pin 3 | Earth |

Power Supplier

See also PS2/505.

1. Connect an 82-ohm resistor between pins 4 and 7 and the other resistor between pins 5 and 9 of the connector.
2. Set the -14 volt supply to 14 volts by adjustment of RV4.
3. Measure the current through the zener diode; this should be 15 to 25 mA. (If this diode is replaced the current is adjusted by selecting R30.)
4. Using the oscilloscope and the amplifier, measure the hum on the -14 volt line; this should be less than 200 μ V.

Amplifier AM1/508

When a bridge diode is replaced it is necessary to re-adjust the amplifier to eliminate d.c. transients at the output when triggering between the *On* and *Off* modes. If any of the following adjustments are made it is necessary to carry out all following adjustments.

(a) D.C. Transients

1. Connect the oscilloscope (unterminated) to the collector of TR10 by means of a flying lead.
2. Set the oscilloscope to 50 mV/cm.
3. Trigger the amplifier to *On* and set the oscilloscope trace to a reference position.
4. Trigger the amplifier to *Off* and restore the position of the trace by adjustment of RV4.
5. Connect the oscilloscope to the output of the amplifier and set the time base at about 0.5 sec/cm.
6. Trigger the amplifier between the *On* and the *Off* mode and adjust RV5 to obtain the smallest possible spikes. (These spikes may be both

positive and negative or all negative but should be less than 80 mV peak.)

(b) Video Bridge Balance

1. Apply 50 volts to the mute relay (+ to pin 12 and - to pin 13).
2. Apply a 625-line pulse and bar waveform to the input at 0.25 volt p-p.
3. Connect the oscilloscope to the main output (terminated) of the AM1/510 with the sensitivity set at 5 mV/cm.
4. Trigger the amplifier to *Off* and adjust RV2 (and RV3) to obtain zero bar output. (Tap the controls lightly to prevent subsequent drift.)
5. Adjust C8 and C10 for minimum pulse component and then readjust RV2, C8 and C10 for optimum.
6. The output should show zero bar amplitude and less than 1 mV of pulse.

(c) Fader Law Adjustment

1. Trigger the amplifier to the *Fade* mode and move the fader to the fully faded-up position. Note the output signal amplitude.
2. Connect the *Control* test point (on the front panel) to the chassis and adjust RV6 to obtain an attenuation of 21.5 dB (12 times).

(d) Amplifier Gain Adjustment

1. Connect the oscilloscope to the unloaded output of the AM1/508.
2. Adjust RV1 to obtain an output amplitude of 235 mV.

*Amplifier AM1/510**(a) Gain Adjustment*

1. Connect the oscilloscope to the main output (terminated).
2. Set the *Main Output* amplitude to 1 volt p-p using the Gain control RV2.
3. Check that the *Secondary Output* amplitude is also 1 volt p-p.

(b) Output D.C. Level

Connect the oscilloscope to the main output and remove the input signal; adjust RV1 for zero d.c. output.

(c) Overall Frequency Response

1. Reconnect the 625-line pulse and bar signal at 0.25 volts p-p via a change-over box arranged so that the AM1/508 can be by-passed.

2. Adjust L1 and C8 to obtain an optimum response within the following limits:

Bar distortion, less than 0.7 per cent.

2T pulse/bar ratio, 1 ± 0.2 per cent.

1T pulse/bar ratio, 1 ± 0.2 per cent.

All pulse overshoots to be less than 0.2 per cent.

W.J.P. 7/66

T.E.S. 12/69