

SECTION 2

VIDEO TAPE RECORDER IDENTIFYING UNIT EP1/502

Introduction

The EP1/502 is used to provide unambiguous identification of a video tape recorder, both sound and video, when the recorder is in the standby condition. The video signal consists of the output of a vidicon camera which scans an illuminated caption; the sound signal is interrupted tone. To ensure that the video and sound signals can be identified as originating from the same source, part of the caption is illuminated by a lamp which flashes in synchronism with the interrupted tone. Discrimination between the outputs of various machines is obtained by adjusting the mark and the space periods of their outputs to different values.

The unit can be fed with either 405 or 625 line-standard pulses and a change of standards takes place automatically within the unit when the line-standard of the input pulses is altered.

The video signal produced by the device is not of transmission quality although the waveform conforms to BBC requirements; the output should not be transmitted in normal circumstances.

The unit comprises the following chassis-mounted sub-units which are described, where appropriate, in the Instructions indicated:

Pye Lynx Camera TVC/1A	Manufacturer's handbook
Video Amplifier AM1/540	V.7
Peak-white Bar Generator GE2/522	V.10
Camera Drive Generator GE2/523	V.10
6-volt Power Supplier and Flasher PS1/8	G.2
9-volt Power Supplier and Audio-signal Processing Unit PS1/9	G.2
Mains Switching Unit UN9/8	—

General Specification

<i>Inputs</i>	Line drive	} 405-line or 625- line standard
	Field drive	
	Mixed syncs	
	Mixed blanking	
<i>Outputs</i>	Video	1-volt p-p composite video across 75

ohms. A white-level bar can be inserted into the waveform for reference purposes.

Sound Interrupted tone at zero level across 600 ohms.

Power Consumption

0.8 amps at 240 volts.

Mechanical Details

A general view of the equipment is shown in Fig. 2.1. The equipment is constructed on a chassis 13 $\frac{3}{4}$ -in. high, 19-in. wide and 17-in. deep which can be mounted in a standard 19-in. bay. The chassis is divided horizontally into two sections the upper of which houses the camera, two mirrors and a translucent screen illuminated by a light-box; the lower section houses the remaining sub-units.

The screen consists of sheets of plastic which slide into the front of the light-box; the sheet nearest to the camera is clear plastic, on which captions can be written, and the others form a translucent diffuser. The light-box contains four fluorescent tubes which provide background illumination for the caption. The flashing lamp, and four indicator lamps, are mounted in a row just behind, and parallel to, the lower edge of the screen.

The mirrors fold the optical path between the camera and the screen and enable the required path-length to be contained within a small space.

General Description

The interconnection of the various sub-units is shown in Fig. 2.2.

The camera is a commercial vidicon type and is modified to enable its time bases to operate in synchronism with station pulses. These time bases are triggered from camera line-drive and camera field-drive pulses generated in the Camera Drive Generator; the relevant circuits in this generator are themselves triggered from station line-drive and field-drive pulses.

The picture-signal output from the camera is taken via contacts of a relay B to the Video Output Amplifier where it is clamped and blanking-pulses

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and sync-pulses are added to give a composite video waveform; the clamp pulses are derived in the Camera Drive Generator. In addition, the white-level bar can be inserted into the waveform. This bar is generated from the trailing edge of mixed blanking pulses, and because of this, an unwanted (half line) white-level pulse is generated at the end of each odd field. This pulse is removed by a gating circuit in the Peak-white Bar Generator which is triggered by half-line gating pulses from the Camera Drive Generator.

The white-level bar is inserted into the signal

during a period defined by extra-blanking pulses. These pulses are applied to a gating circuit in the video amplifier, which removes picture information, thereby simplifying measurement of the bar amplitude. Generation of the extra-blanking pulses is carried out by a circuit in the Peak White Bar Generator, triggered by extra-blanking-generator pulses from the Camera Drive Generator.

The black-level of the video output can be varied by a *Black Level* control on the Camera Drive Generator. The amplitude of sync pulses and of the overall video gain are set by *Sync Gain*

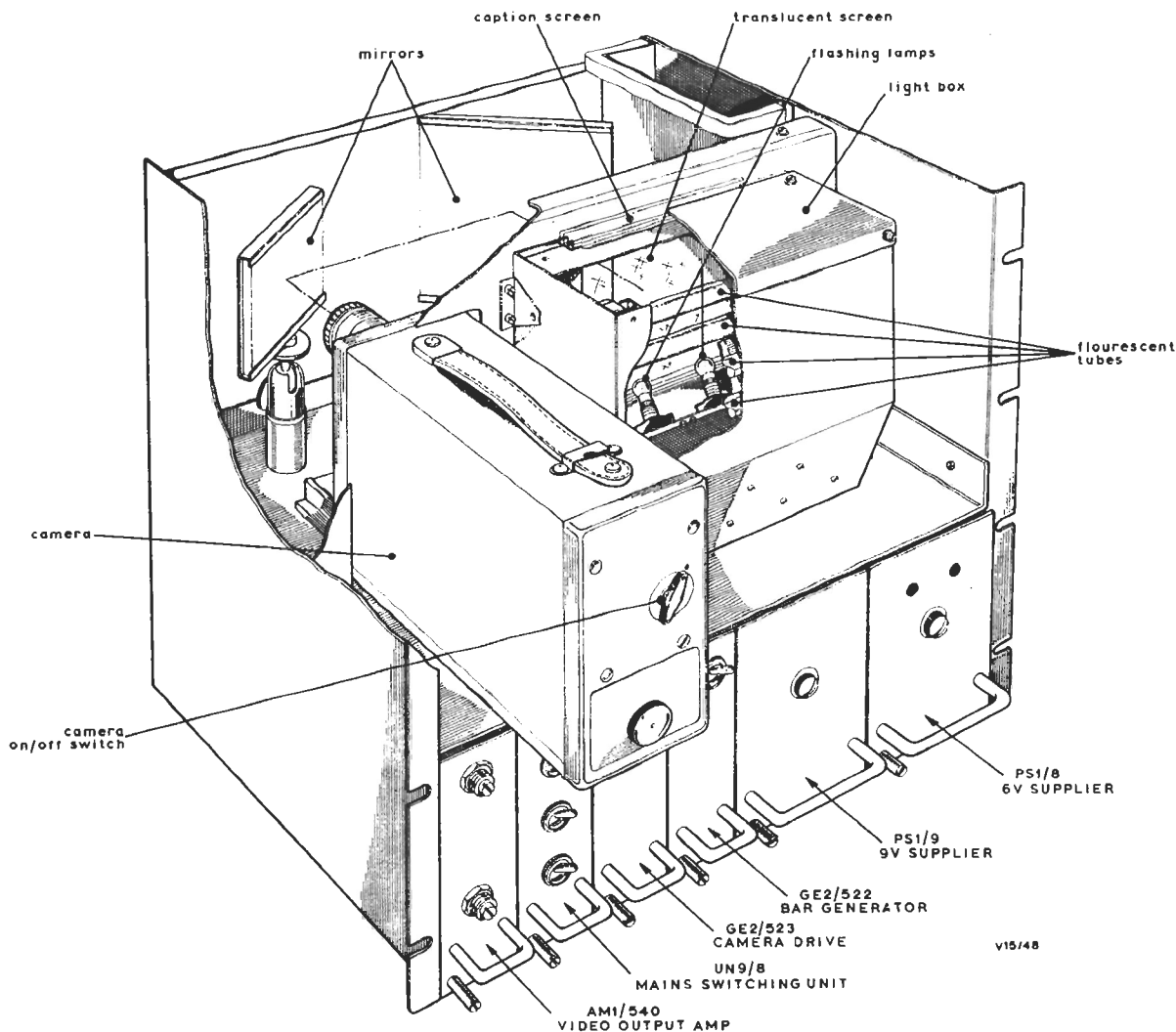
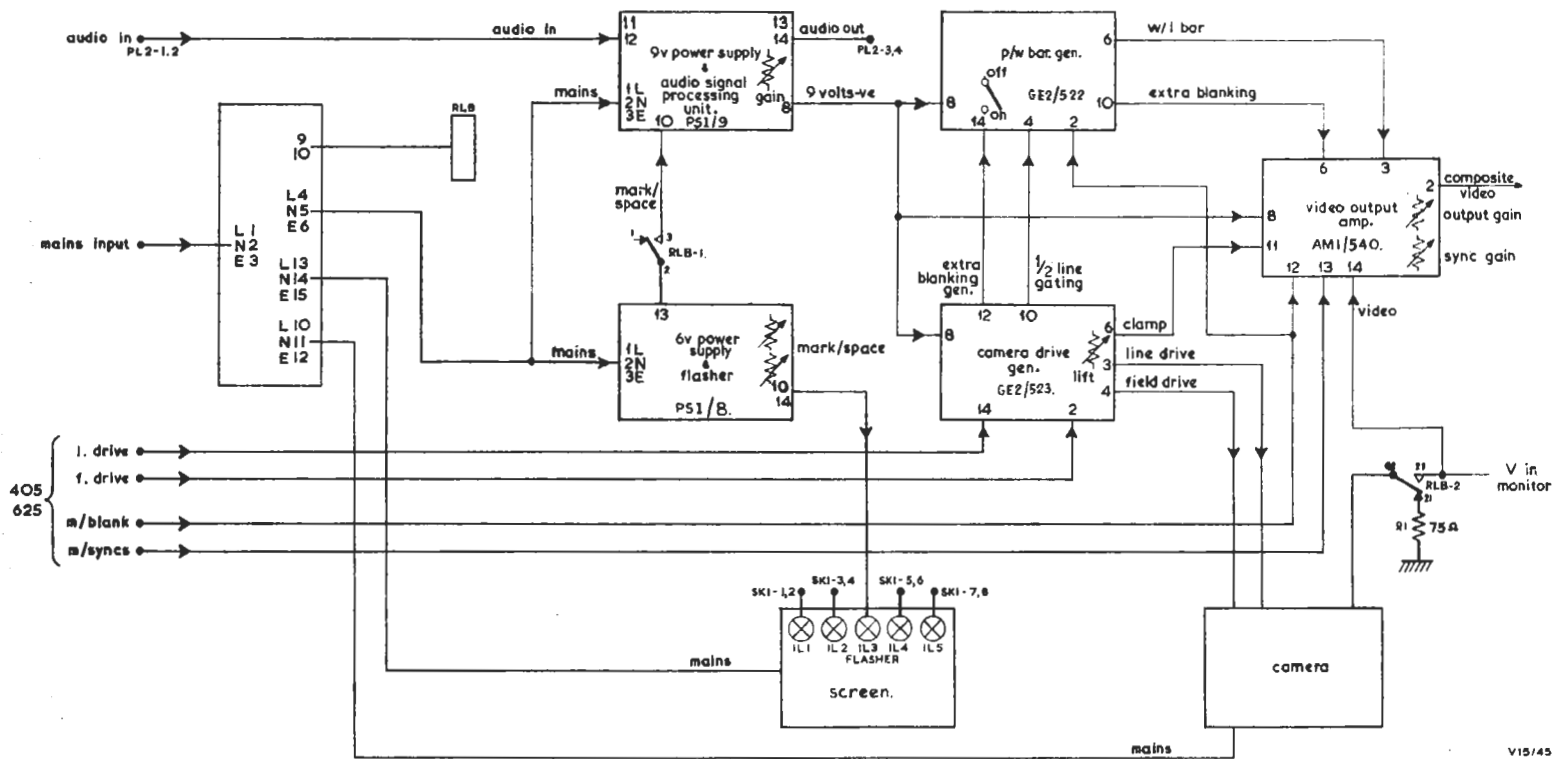


Fig. 2.1 General View of the EPI/502

Fig. 2.2 Block Diagram of the EP1/502
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and *Video Output Gain* controls respectively on the video amplifier.

An interrupted supply, to operate both the flashing lamp in the light box and a tone-interrupting relay, is provided by the 6-volt Power Supplier and Flasher. The tone-interrupting relay is in the 9-volt Power Supplier Audio Signal Processing Unit which, in addition, provides a 9-volt supply to operate the other sub-units.

The mains-switching unit provides three individual switched mains outputs designated

Picture Channel
Screen
Camera

Camera Modifications

The main modifications to the camera enable its time bases to operate in synchronism with station pulses. A circuit diagram of the camera in its unmodified form is provided in the manufacturer's service manual. Those parts of the circuit which are altered are shown in both their original and modified forms in Fig. 2.3.

Two further modifications to the circuit are not shown in the diagram. One of these is a 33-pF capacitor (Erie type N70AD, 5%) which is connected between the collector of V6 and earth to eliminate 20-MHz parasitic oscillation. The other is a Brimistor (S.T. and C.: type CZ29A) which is connected in parallel with R78 on a time-base panel and provides temperature compensation for the vertical-scan coils.

Setting-up Procedure

Equipment Required

Oscilloscope

Dual standard 405/625-line picture monitor

Avometer Model 8

Chassis Extender CH1A/1

625/405 pulse feeds:

line drive

field drive

mixed syncs

mixed blanking

240-volt mains power supply

Tone source

Alignment

Before connecting the power supply ensure that all the switches on the Mains Switching Unit are in the *Off* position.

1. Connect the 405-line pulses, the tone source and the mains supply to the appropriate

sockets.

2. Remove the 9-volt power supplier PS1/9 and replace it on the extender board.

Connect the Avometer between the emitter of TR3 and chassis (pin 4) and then switch on the picture channel (UN9/8).

Adjust RV1 to make the emitter potential -9 volts.

Switch off and replace the PS1/9.

3. Remove the 6-volt power supplier PS1/8, replace it on the extender board.

Switch on the picture channel.

Check that the potential at the emitter of TR3 is between -6 and -7 volts.

Check that the lamp at the bottom of the screen is flashing.

Check that there is tone at the audio-output socket and that it is being interrupted in synchronism with the flashing lamp.

Switch off and replace the PS1/8.

4. Connect the oscilloscope and the picture monitor to the video-output socket and check that an output is present; this should consist of 405-line syncs and blanking.

Check that the *Black Level* control operates and set the black level to blanking level.

5. Switch on the GE2/522 and check that a white bar appears down the left-hand side of the picture. This bar should be approximately $2 \mu\text{s}$ in duration ($4 \mu\text{s}$ on 625 lines) and should be followed by $2 \mu\text{s}$ of blanking.

If necessary, adjust the duration of the bar by selecting R24 in the GE2/522.

6. Adjust the *Video Output Gain* control on the front of the AM1/540 to make the amplitude of the bar waveform 0.7 volt.

7. Adjust the *Sync Gain* control to make the amplitude of the syncs 0.3 volt.

8. Switch on the fluorescent lamps in the light box.

9. Switch on the camera and adjust the controls to obtain a picture as described in the manufacturer's handbook.

When the white-level bar is switched off it is necessary to re-adjust the black-level thus altering the clamping of the video signal.

Clipping of the video output waveform is corrected by selection of the value of R33 in the AM1/540.

10. Repeat from 4 using 625-line pulses.

Diagrams of waveforms at various points in the sub-units are shown in Fig. 2.4.

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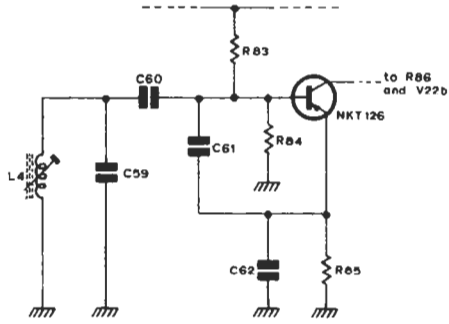


Fig A : original circuit

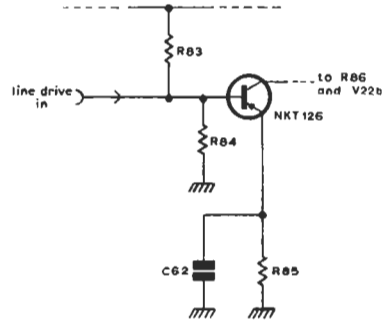


Fig B : modified circuit

Horizontal Oscillator

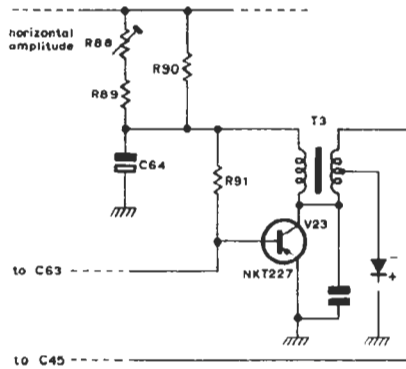


Fig C : original circuit

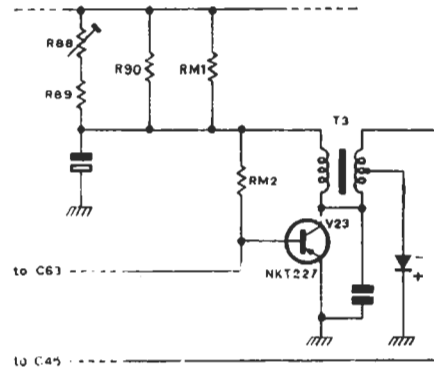


Fig D : modified circuit

Horizontal Scan Output

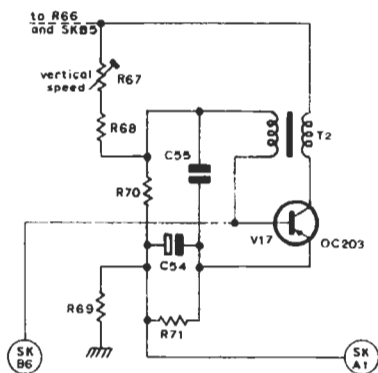


Fig E : original circuit

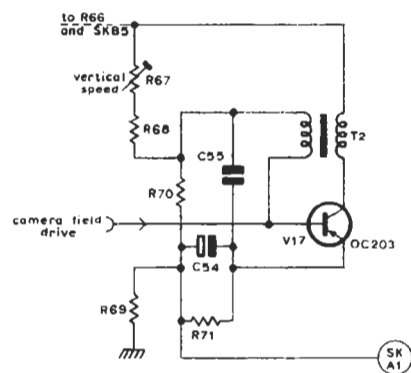


Fig F : modified circuit

Vertical Oscillator and Blanking Generator

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Fig. 2.3 Circuit Modifications for the Camera

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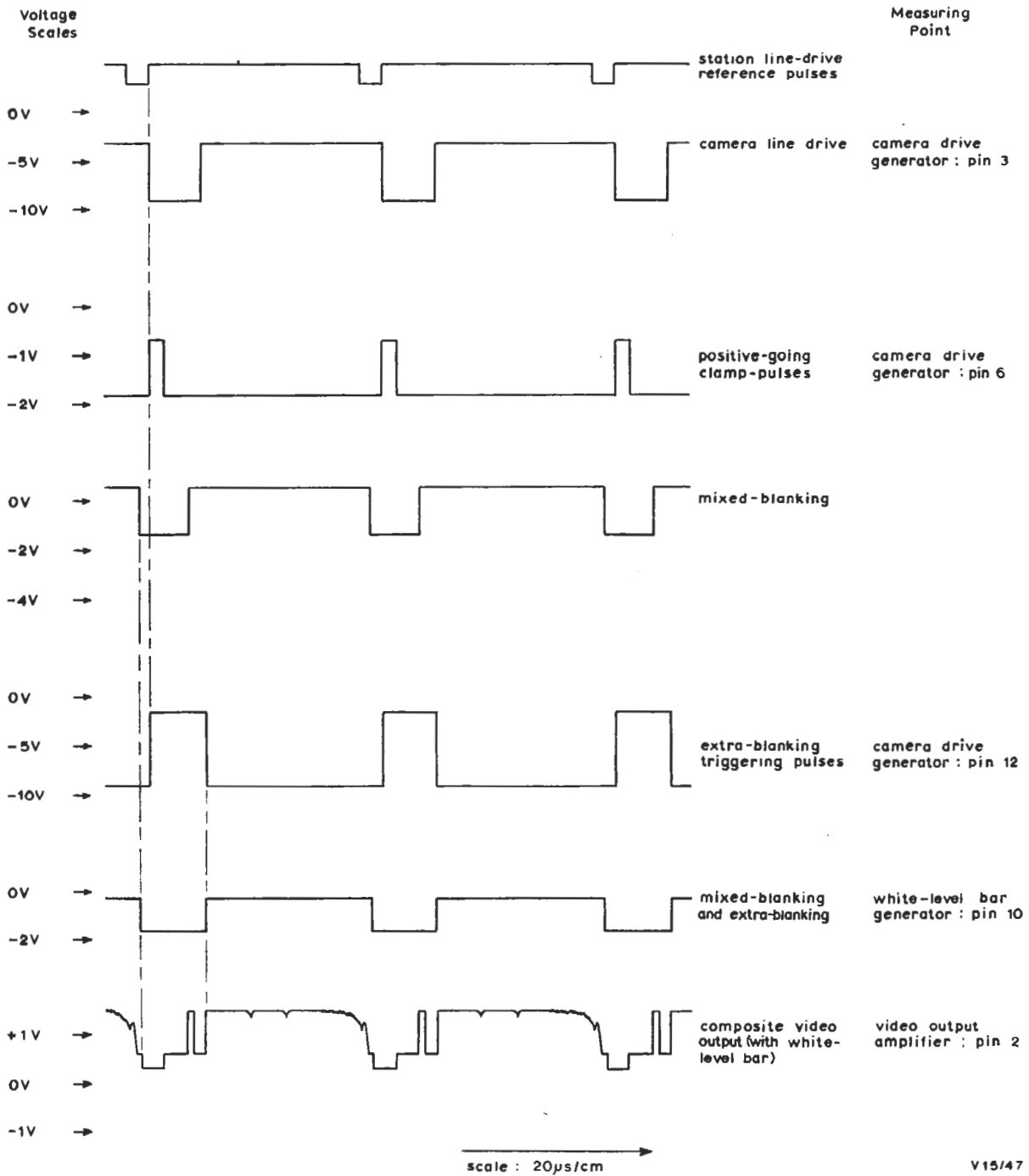


Fig. 2.4 Waveforms in the EPI/502

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