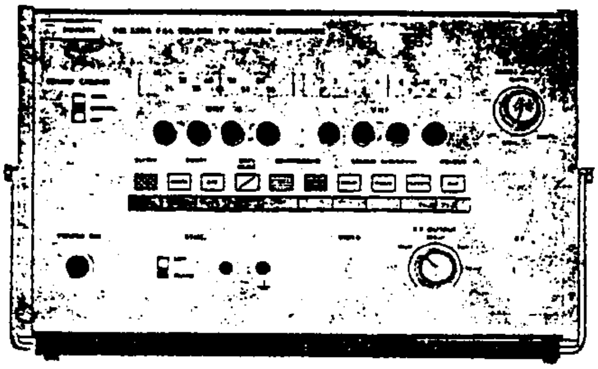


PHILIPS

service manual

PAL-COLOUR PATTERN GENERATORS
PM 5506 and PM 5508

(9449 055 06..1) (9449 055 08..1)

4822 731 10132 2/871/2

PHILIPS

SERVICE

Electron optics / Nuclear and electrochemical equipment / X-Ray analysis / Cryogenic equipment / Test and measuring equipment / Process instrumentation / Industrial Data Processing Systems / Weighing / Welding / Numerical Control / Textile equipment

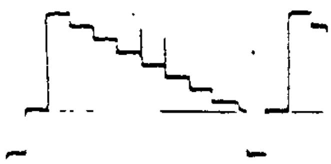
industrial equipment division

721107 PM 5508 Cd 762

TEST AND MEASURING EQUIPMENT

Re: Instructions to reduce peaks on the signals of the Colour Pattern Generator PM 5508/07 and higher versions.

It is apparent that in some instruments because of the particular location of wires in the wiringloom, there could be a strong coupling with wires carrying peak pulses. This give rise to peaks on two steps in the centre of the greyscale or colourbar as shown below.



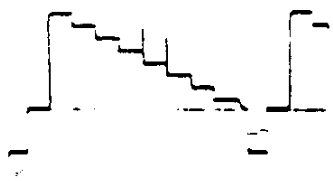
MA7678

These peaks can be reduced by disconnecting the wires from point 25 of unit 2b to switch SK3/10 and from point 10 of unit 2c to switch SK3/1.
Rewire the same points as above mentioned, but only loosely mounted to the wiringloom.

- - - - - - - - - - -

Betrifft: Verkleinerung der Signalspitzen des Schwarzweiss- und Farbmuster-Generators PM 5508 von der -/07-Ausführung an aufwärts.

Es ist klar, dass es durch die besondere Anordnung der Drähte im Kabelbaum in einigen Generatoren mit den impulsführenden Drähten eine besonders ausgeprägte Kupplung gibt. Dies kann Spitzen hervorrufen, und zwar auf zwei Stufen in der Mitte der Grautreppe oder des Farbbalkens (siehe Abb.).



MA7678

Die Spitzen werden durch Lösen der Verbindungen zwischen Punkt 25 von Einheit 26 und Schalter SK3/10 sowie zwischen Punkt 10 von Einheit 2c und Schalter SK3/1 verkleinert. Dieselben Punkte werden neuverdrahtet, wobei die neue Verdrahtung lose neben dem Kabelbaum verläuft.

PHILIPS

SERVICE

Electron optics / Nuclear and electrochemical equipment / X-Ray analysis / Cryogenic equipment / Test and measuring equipment / Process instrumentation / Industrial Data Processing Systems / Weighing / Welding / Numerical Control / Textile equipment

industrial equipment division

1-11-1971 PM 5508 Cd 716

Already issued: Cd 579, Cd 583, Cd 606 and Cd 671
Re : Versions /06 and /07.

This is a supplement to the Service Manual for the PAL-colour pattern generator PM 5508, ordering number 4822 731 10132.

The following point has been modified in version /06:

- To increase the adjusting range of C413 (unit 4a), R415 has become 680 Ω, ½ W, 5 %.

The following points have been modified in version /07:

- On unit 1, diode GR101 (BY122) replaced by BY164 and due to this, the print-tracks were modified (see fig. 1).
- On unit 2C, diode GR247 (BAY38) replaced by BAW62.

Schon veröffentlicht: Cd 606 und Cd 671
Betrifft : Ausführungen /06 und /07.

Dies ist ein Supplement zur Kundendienstanleitung für den PAL-Farbbildmustergenerator PM 5508, Bestellnummer 4822 731 10181.

In der Ausführung -/06 ist folgendes geändert worden:

- R415 (Einheit 4a) wurde 680 Ω - ½ W - 5 %, um den Einstelbereich von C413 zu erweitern.

In der Ausführung -/07 ist folgendes geändert worden:

- Auf der Einheit 1 wurde GR101 (BY122) durch BY164 ersetzt, und dadurch wurden die Spuren der Leiterplatte geändert.
- Auf Einheit 2C wurde GR247 (BAY38) durch BAW62 ersetzt.

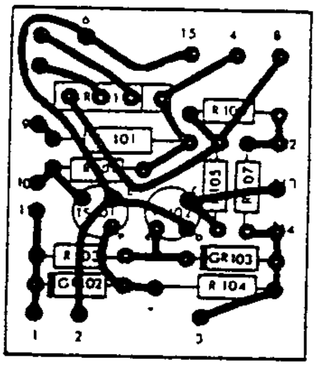


Fig. 1/Abb. 1

Changed components - Geänderte Bauelemente.

Item/Pos.	Ordering number/Bestellnummer	Description/Bezeichnung
GR101	4822 130 30414	Rectifier BY164
GR247	5322 130 30613	BAW62

Contents

List of figures

I. GENERAL

A. INTRODUCTION

The PHILIPS PAL-colour pattern generators PM 5506 and PM 5508 are all solid-state, mains-powered instruments. They are intended for use when installing, fault-tracing and repairing colour TV sets operating according to the PAL-AB system and for black/white TV-sets operating according to the 625 lines CCIR systems, B, I, G and H.

B. TECHNICAL DATA

Properties expressed in numerical values with tolerances stated, are guaranteed by us. Numerical values without tolerances are intended for information purposes only and indicate the properties of an average instrument.

Vision carrier

PM 5506:	Band IV/V 470 – 850 MHz Push-buttons enable presetting of 4 arbitrary UHF channels.
PM 5508:	IF approx. 38.9 MHz Band I 55 ... 70 MHz Band III 173 ... 225 MHz Band IV/V 470 ... 850 MHz Push-buttons enable presetting of 4 VHF channels (incl. IF) and 4 arbitrary UHF channels.

Spacing of vision and sound carriers

PM 5506E:	5.5 MHz (CCIR systems G and H)
PM 5506B:	6.0 MHz (CCIR system I)
PM 5508:	5.5 MHz (CCIR systems B, G and H)
Frequency drift of sound subcarrier:	± 0.1% (10° ... 40° C)

Video modulation

Modulation	AM, negative
Residual carrier	15% at 100% white
Vision modulator	balanced diode type; max. unbalance 5%
Differential phase	< 5°

Sound modulation

Modulation	FM
Sweep	± 50 kHz
Distortion	< 3%
Pre-emphasis	50 μs
Internal modulation	1 kHz, sinewave
Modes of operation	– sound carrier off – unmodulated – modulated with 1 kHz

Encoding

System	PAL-AB
Subcarrier	4.433619 MHz
Frequency drift of subcarrier	± 20 Hz (10° . . . 40° C)
Burst width	10 cycles of subcarrier
Burst amplitude	"NOM" position: equal to sync. signal adjustable: from approx. 0% to 200%
Burst phase	line sequential: 180° ± 45°
Burst position	5.6 μs after leading edge of line sync. pulse
Chroma modulators	balanced diode type
Chroma bandwidth (3 dB)	1.1 MHz
Group delay precorrection of chroma signal	— 175 ns
Colour matrixing	Y = 0.30 R + 0.59 G + 0.11 B

Patterns

"CHECKERBOARD"	6 x 8 black/white squares, accurately centred.
"WHITE"	100% white signal with PAL-AB burst.
"RED"	fully saturated red signal with PAL-AB burst.
"GREYSCALE"	staicase signal with 8 identical steps.
"DOTS"	white dots: location corresponds to the intersections in the cross-hatch pattern.
"CROSSHATCH"	11 horizontal white lines: width: one line per field 15 vertical white lines: width 200 ns. The horizontal and vertical white lines form black squares, accurately centred.
"DELAY"	4 vertical bars: 146° : (G-Y) = 0, 180° : (R-Y) = 0, 90° : (B-Y) = 0, and grey (40%). NTSC encoded, however with PAL-AB burst.
"PHASE"	Same bars as "DELAY" with PAL-AB burst. However, upper half: PAL encoded with half the saturation, and lower half: only chroma during the "positive" PAL-lines, where burst phase = 135°.
"MATRIX"	same bars as "DELAY" with PAL-AB burst, however, completely PAL encoded.
"COLOURBAR" *	75%-contrast, colour bar signal with 8 bars: white, yellow, cyan, green, magenta, red, blue and black.

Bar	Relative luminance amplitude	Chroma phase	Relative chroma amplitude
White	0.75	—	—
Yellow	0.67	167°	± 0.33
Cyan	0.53	283°	± 0.47
Green	0.44	241°	± 0.44
Magenta	0.31	61°	± 0.44
Red	0.23	103°	± 0.47
Blue	0.08	347°	± 0.33
Black	0	—	—

* See also page 40, modified "COLOUR BAR" pattern

Synchronisation and blanking

Line frequency	15625 Hz ± 0.1%
Field sync. pulse	width 2.5 lines (no inverted line pulses during field sync.pulse, no equalizing pulses, no interlacing)
Line sync. pulse	width 4.8 μs frontporch 1.9 μs backporch 6.1 μs
Field blanking	24 lines
Line blanking	12.8 μs
Total field period	312 lines
Active field period	288 lines
Total line period	64 μs
Active line period	51.2 μs
Set-up between black level and blanking	5%
Sync. to picture ratio	30 : 70

Outputs

Socket "RF"

Voltage PM 5506	20 mV *), if loaded with 75 Ω, or 40 mV *), if loaded with 300 Ω (via matching transformer 75 Ω → 300 Ω), continuously adjustable.
Voltage PM 5508	for UHF as with PM 5506, for VHF 15 mV *), if loaded with 75 Ω, or 30 mV *), if loaded with 300 Ω (via matching transformer 75 Ω → 300 Ω), continuously adjustable.
Output impedance	75 Ω
Amplitude ratio vision to sound carrier	4 : 1
Connector	BNC, female

Socket "VIDEO"

Voltage	1 Vp-p, if loaded with 75 Ω
Polarity	white positive, sync. negative
Output impedance	75 Ω
Connector	BNC, female

Sockets "SYNC."

Signal	optionally: - line frequency pulses - field frequency pulses to be selected with switch "SYNC."
Amplitude	5 Vp-p, unloaded
Polarity	positive
Output impedance	10 kΩ
Connectors	4 mm banana sockets

Supply

Mains voltage	115 V or 230 V, ± 20%
Mains frequency	50-60 Hz
Power consumption	15 W at 220 V
Safety fuse	200 mA, delayed action

*) R.M.S. value of the vision carrier during the peaks of the modulation envelope.

Mechanical data

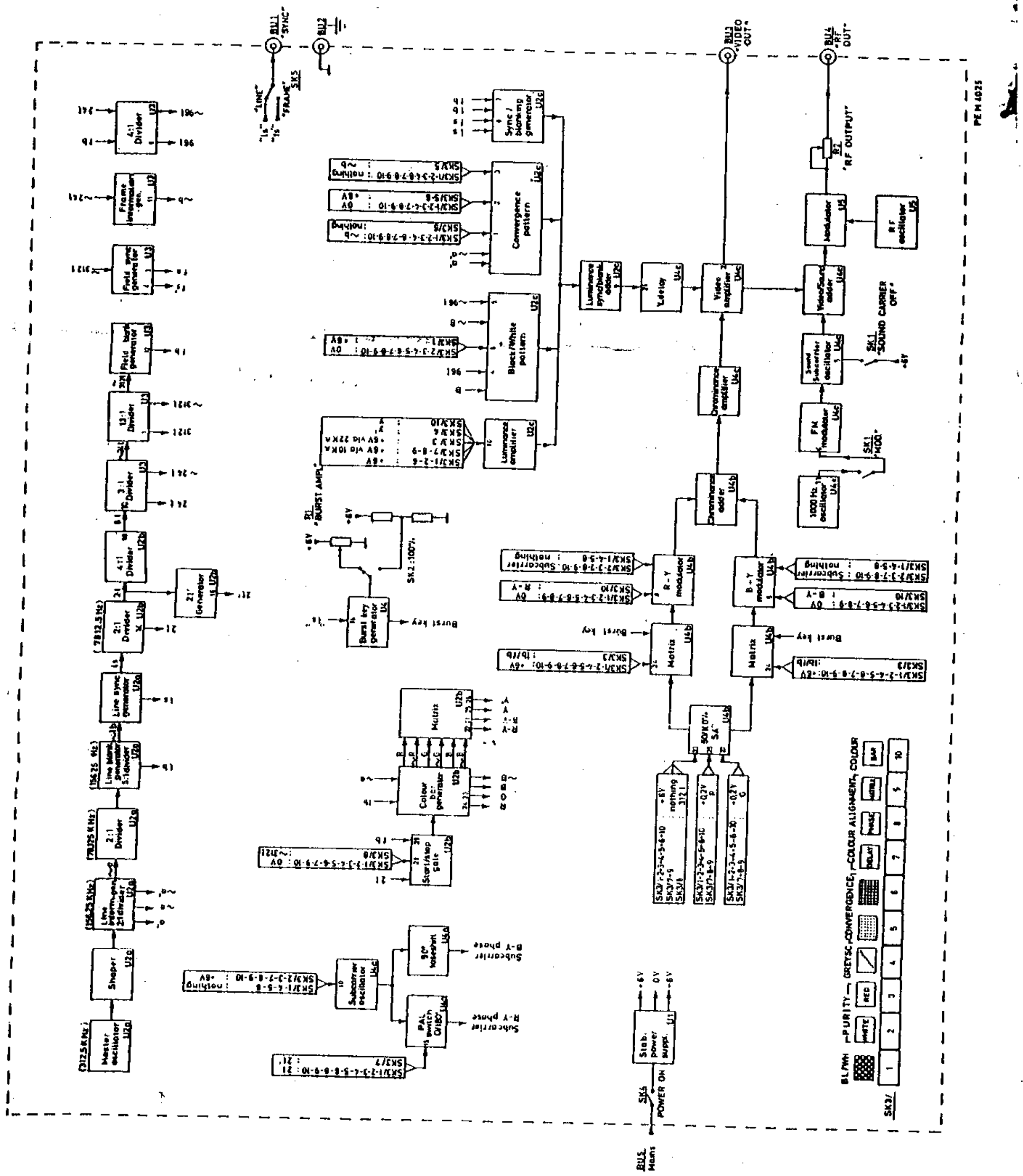
Dimensions	Modular cabinet	
Height x width x depth	195 x 235 x 275 mm (width: 3 units)	PM 5506
Weight	4,5 kg	
Height x width x depth	195 x 305 x 275 mm (width: 4 units)	PM 5508
Weight	6.1 kg	

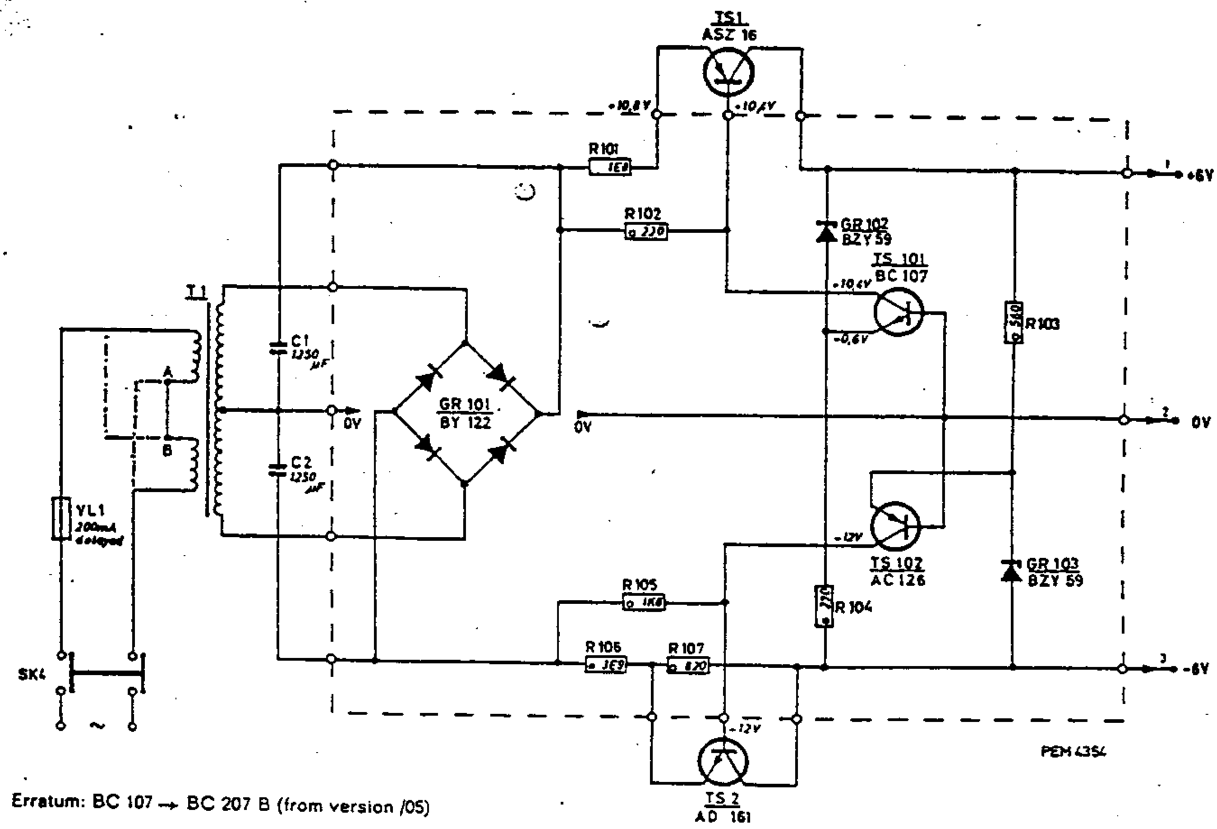
C. ACCESSORIES

1 Operating manual
1 Mains flex
1 RF cable, with only for PM 5506E and PM 5508, a matching transformer 75 Ω → 300 Ω.
1 VHF - Adaptor
1 UHF - Adaptor

D. BLOCK DIAGRAM

For description refer to the "Operating manual".





Erratum: BC 107 → BC 207 B (from version /05)

Fig. II-1. Circuit diagram power supply, unit 1

II. CIRCUIT DESCRIPTION

A. POWER SUPPLY - UNIT 1 (see Fig. II-1)

The power supply delivers stabilized voltages of + 6 V and — 6 V.
The stabilizing circuit for + 6 V consists of transistors TS101 and TS1, and Zener diode GR102.
The circuit for — 6 V is similar to that for + 6 V. It consists of TS102, TS2, and Zener diode GR103.
Stabilization is obtained as follows:
The emitter voltages of TS101 and TS102 are kept constant with respect to + 6 V and — 6 V. This is effected by means of Zener diodes GR 102 and GR103.
The base voltages of TS101 and TS102 are kept at 0 V.
If, for example, + 6V increases, the voltage on the base of TS101 will decrease with respect to the emitter voltage. Then the current in TS101 decreases. The base voltage, and the current in TS1 depend on the voltage division effected by R102 and TS101.
In this case the current in TS101 is reduced, and thus the base voltage of TS1 will become more positive (via R102) with respect to the emitter voltage.
The current in TS1 decreases, and the + 6 V voltage is restored to its nominal value.
The working of the — 6 V stabilization is similar to that of the + 6 V stabilization.
The power supply is also protected against short circuit. For instance, a short circuit between terminals 1 and 2 would cause the voltage on emitter TS102 to become 0 V. TS102, and consequently TS2 will be cut off, and the voltage at terminal 3 will be 0.
0 V at terminal 3 would, via R104, likewise drive TS101, and consequently TS1, into cut-off.
Both TS1 and TS2 are driven into cut-off, and the power supply is disconnected. The short circuit protection applies in the same way to short circuit between terminals 2 and 3.
An overload of one voltage will cause interruption of both voltages.

B. LINE INFORMATION - UNIT 2

Master oscillator - Unit 2a (see Fig. II-2)

TS201 and TS202 form an emitter-coupled LC oscillator. This oscillator operates as a master oscillator controlling the generators for sync. signals, line information, picture information, and the PAL switching pulses.
The oscillator frequency is 312.5 kHz.
The frequency is determined by L201, C203.

Pulse shaper - Unit 2a (see Fig. II-2)

The signal from the master oscillator is a sinewave. The following divider should be controlled by a squarewave signal to obtain stable triggering. Therefore it is necessary to convert the sinewave into a squarewave signal. This is effected in shaper TS203.
This transistor is cut off when no signal is applied to the base.
The applied signal has such a high amplitude that the positive half period will drive TS203 into saturation very fast.
The pulse obtained on the collector of TS203 is practically a squarewave.

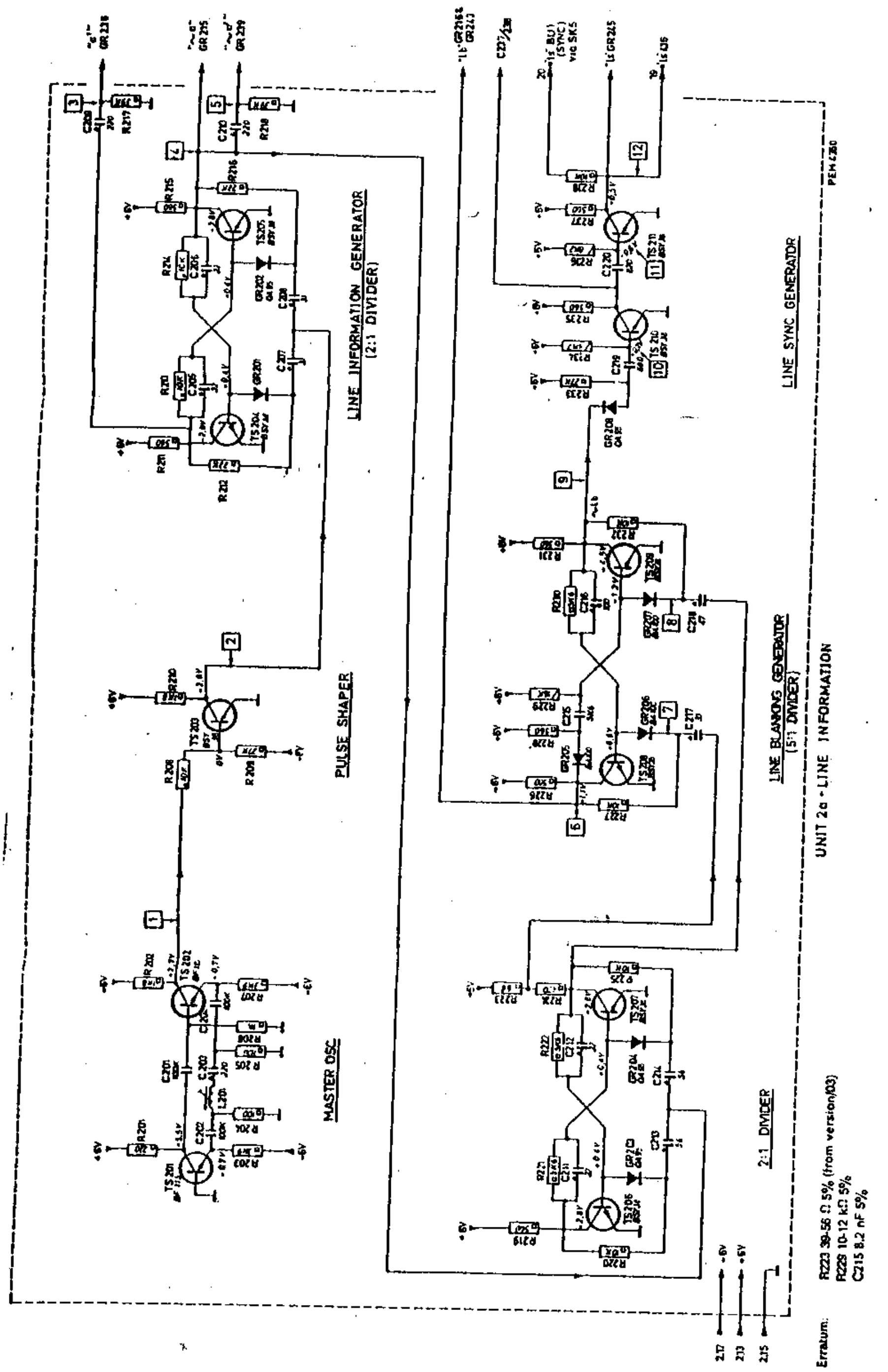
Line information generator - Unit 2a (see Fig. II-2)

This generator supplies pulses "a'", "~a" and "~a'" giving the horizontal picture information ("a'" and "~a'") for the crosshatch and dot patterns, while pulse "~a") is used for controlling the colour bar generator.
The circuit, consisting of transistors TS204 and TS205, is a bistable multivibrator which divides the applied squarewave by two.
The control pulses from pulse shaper TS203 applied to the divider are differentiated in C207/R212 and C208/216 successively.
Diodes GR201 and GR202 ensure that only the negative part of the pulse can reach the base of TS204 and TS205.
The working principle of the generator is shown in Fig. II-3.
At moment t_1, before the first negative-going drive pulse arrives, e.g. TS204 is saturated so that its collector voltage will be low.
At the same time TS205 will be cut off, and its collector voltage will be high.
At moment t_2 a negative-going drive pulse is applied to the base of TS204 (GR202 not conducting) so that this transistor is cut off.
The positive pulse at the collector of TS204 drives TS205 into saturation.
At moment t_3 the process is repeated, only this time TS205 is driven into cut-off and, consequently, TS204 into saturation.
Capacitors C205 and C206 ensure that the generated pulses have the proper rise time.

2 : 1 Divider - Unit 2a (see Fig. II-2)

This generator consists of TS206 and TS207 which produces drive pulses for the "Line blanking generator". The divider is an astable multivibrator, and its working principle is the same as that of the "Line information generator".
The generated pulses have a frequency of:

$$\frac{156.25}{2} \text{kHz} = 78.125 \text{ kHz}.$$


MASTER OSC
PULSE SHAPER
LINE INFORMATION GENERATOR
(2:1 DIVIDER)
2:1 DIVIDER
LINE BLANKING GENERATOR
(5:1 DIVIDER)
LINE SYNC GENERATOR
UNIT 2a - LINE INFORMATION
Erratum:
R223 39-56 Ω 5% (from version03)
R228 10-12 kΩ 5%
C215 8.2 nF 5%

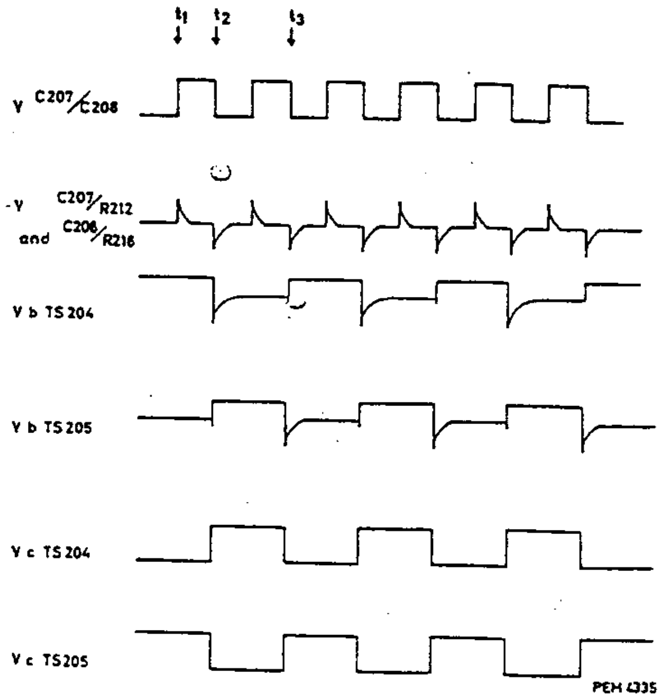


Fig. II-3. Working principle line information generator

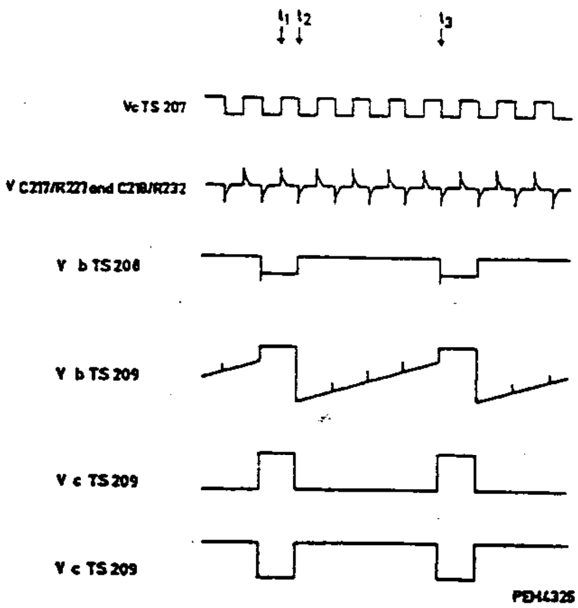


Fig. II-4. Working principle line blanking generator

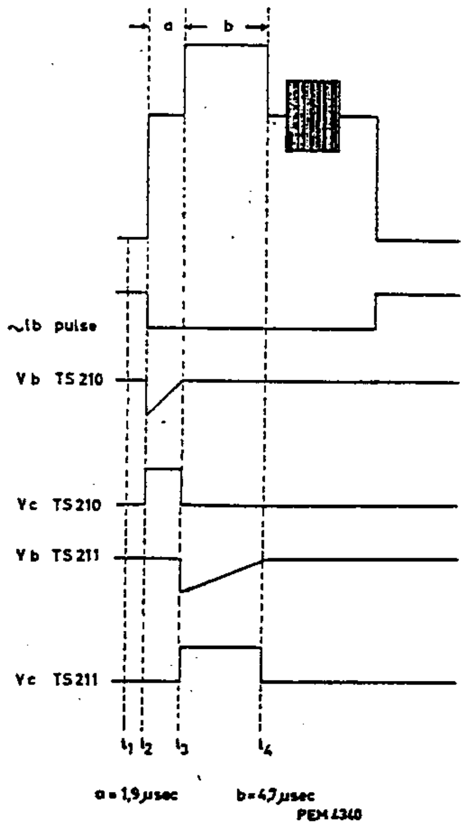


Fig. II-5. Working principle line sync. generator

Line blanking generator – Unit 2a (see Fig. II-2)

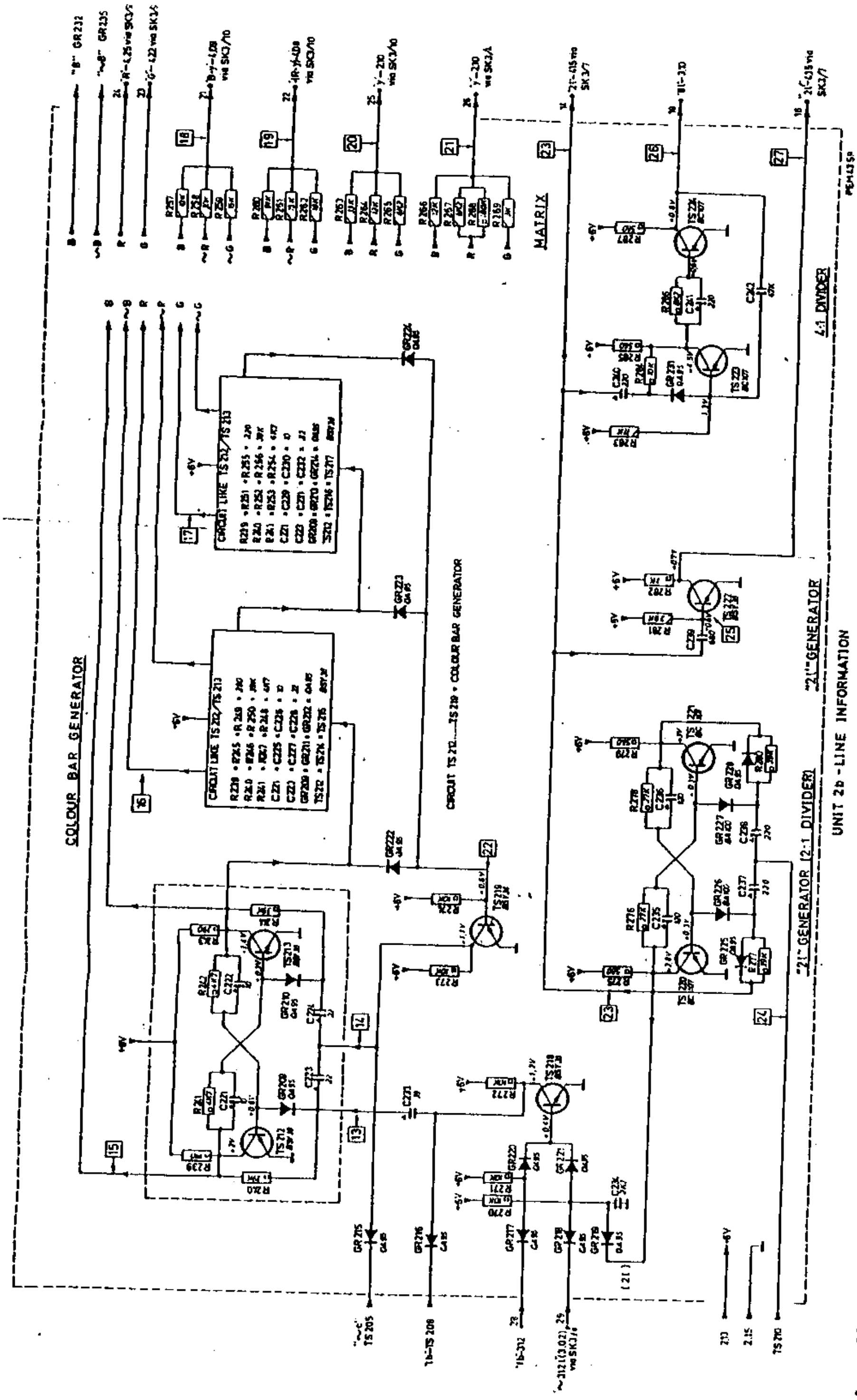
The generator for line blanking pulses is a 5 : 1 divider consisting of TS208 and TS209.
The drive pulses for the generator are differentiated by C217/R227 and C218/R232 successively.
Diodes GR206 and GR207 only pass on the negative part of the differentiated pulse to the base of TS208 and TS209.
The working principle of the generator is shown in Fig. II-4.
At moment t_1 e.g. TS208 is cut off and consequently TS209 is saturated.
At moment t_2 a negative-going drive pulse drives TS209 into cut-off via GR207.
The positive-going pulse on the collector of TS209 will drive TS208 into saturation via R230/C216.
The negative step on the collector of TS208 will charge C215 via GR205 so that a high negative voltage appears on the base of TS209.
TS209 is cut off until C215 is so far discharged via R229 that the positive pulses applied via GR206, TS208 and GR205 can drive TS209 into saturation again (moment t_3).
GR205 and C216 ensure that the line blanking pulses have the correct rise time.

Line sync. generator – Unit 2a (see Fig. II-2)

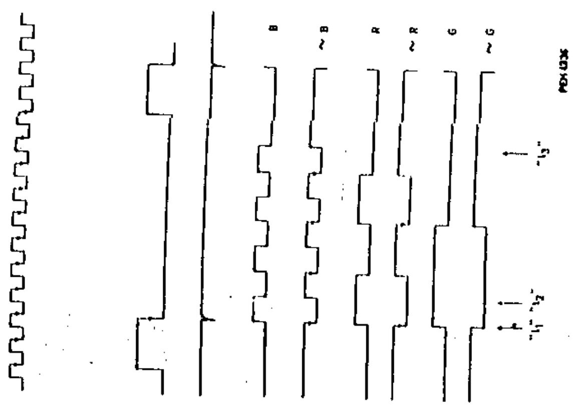
This generator consists of the two pulse delay circuits C219, R234, TS210 and C220, R236, TS211.
RC circuit C219, R234 provides a delay time "a" (1.9 μs) (see Fig. II-5) which corresponds to the front porch.
C220, R236 determines the width of the line sync. pulse ("b" = 4.7 μs).
The working principle is shown in Fig. II-5.
With no signal on their bases TS210 and TS211 are in saturation (moment t_1). This is due to the + 6 V via R234 and R236.
At moment t_2 the (negative-going) leading edge of the "~ lb" pulse will cut off TS210 and charge C219 to a negative value (current towards the base).
The positive-going pulse in the collector of TS210 will have a width determined by the discharge time of C219 via R234 (internal $t_2 \ldots t_3$).
At moment t_3 the negative-going trailing edge of the pulse from the collector of TS210 will cut off TS211.
The cut-off time and thus the width of the line sync. pulse ("ls") at the collector of TS211 depends on the discharge of C220 via R236 (time t_4).

Colour bar generator – Unit 2b (see Fig. II-6)

The colour bar generator consists of a divider formed by three identical series-coupled flip-flops (TS212 . . . TS217).
Each of these circuits divides the applied "~a" signal by two.
Diodes GR222, GR223 and GR224 form an AND gate which, via TS219, will short circuit the applied "~a" signal when the output voltages of the three flip-flops to the diodes all are + 6 V.
The working principle of the colour bar generator is shown in Fig. II-7.
At moment t_1 the three flip-flops are set by means of differentiated line blanking pulses (applied via GR216).
As a result the voltages to the three diodes of the AND gate will become 0 V, and TS219 is driven into cut-off.
The "~a" pulses can affect circuit TS212-TS213 during interval t_1-t_3. The dividing process starts at moment t_2 and goes on, as indicated, till moment t_3 when all diode voltages are + 6 V.
The "~a" signal is short circuited via TS 219, and counting stops.
At the trailing edge of the next line blanking pulse, time t_1 is reached again, and the process is repeated.
During the frame blanking period the generator is stopped. This is achieved by means of the "fb" pulses which, via GR 217 and GR220, will drive TS218 into saturation during the blanking period. The setting pulses ("lb") are consequently short circuited, and the generator is stopped.
In test pattern "PHASE" the signals from the colour bar generator are only used every second line in the lower part of the pattern (from line 169 to line 288).
The drive signal to the generator is in this test pattern obtained by means of signals "312 l" and "2 l" which are applied to AND gate GR218/GR219.
The signal from the gate drives TS218 into saturation every second line in the lower part of the test pattern.
As a result the setting pulses ("lb") are short circuited, and the generator is stopped for these periods.



Erratum: BC 107 → BC 207 B (from version /05)



Matrix – Unit 2b (see Fig. II-6)

Resistors R257 . . . R269 form four matrixes for (B-Y), – (R-Y), Y and Y' signals.
The structure of the signals may be seen from Figs. II-8, II-9, II-10 and II-11. The reason why a – (R-Y) signal is generated, is explained in unit 4b under the description of the modulators.

"2 I" Generator – (2 : 1 Divider) – Unit 2b (see Fig. II-6)

This generator (TS220-TS221) supplies the drive pulses to the PAL switch in unit 4a. The divider is a bistable multivibrator, and its working principle is the same as that of the line information generator.
The drive pulses of the generator are positive-going pulses, the width of which corresponds to the line front porch (from TS210 in unit 2a).
The switch controls the negative-going back porch of these pulses, which correspond to the leading edge of the line sync. pulses.

"2 I' " Generator – Unit 2b (see Fig. II-6)

Test pattern "DELAY" consists of an NTSC-like signal in which, however, the burst is PAL switched. The drive pulse to the PAL switch (unit 4a) therefore should be as shown in Fig. II-12.
These pulses are obtained in circuit C239/R281-TS222.
The working principle is shown in Fig. II-12.
With no signal applied to the base, TS222 is in saturation.
The negative-going edges of the applied "2 I" pulses will drive the transistor into cut-off. The cut-off time of collector TS222, and thus the width of the positive pulse, depends on the discharge of C239 via R281.

4 : 1 Divider – Unit 2b (see Fig. II-6)

This divider is a monostable multivibrator (one shot).
The working principle is shown in Fig. II-13.
The divider is triggered via GR231 by means of the negative-going edge of the "2 I" pulse (time t_1).
TS223 is driven into cut-off, and the positive voltage step at the collector drives TS224 into saturation. The collector voltage of TS224 decreases, and the negative pulse on the base of TS223 keeps this transistor cut-off for a period determined by RC-circuit C242/R283.
When TS223 is cut off, GR231 is non-conducting, and the trigger pulses are prevented to reach TS223.
At time t_2 C242 is so far discharged that TS223 is driven into saturation via R283.
At time t_3 the next negative-going edge of the "2 I" pulse drives TS223 into cut-off, and the process is repeated.

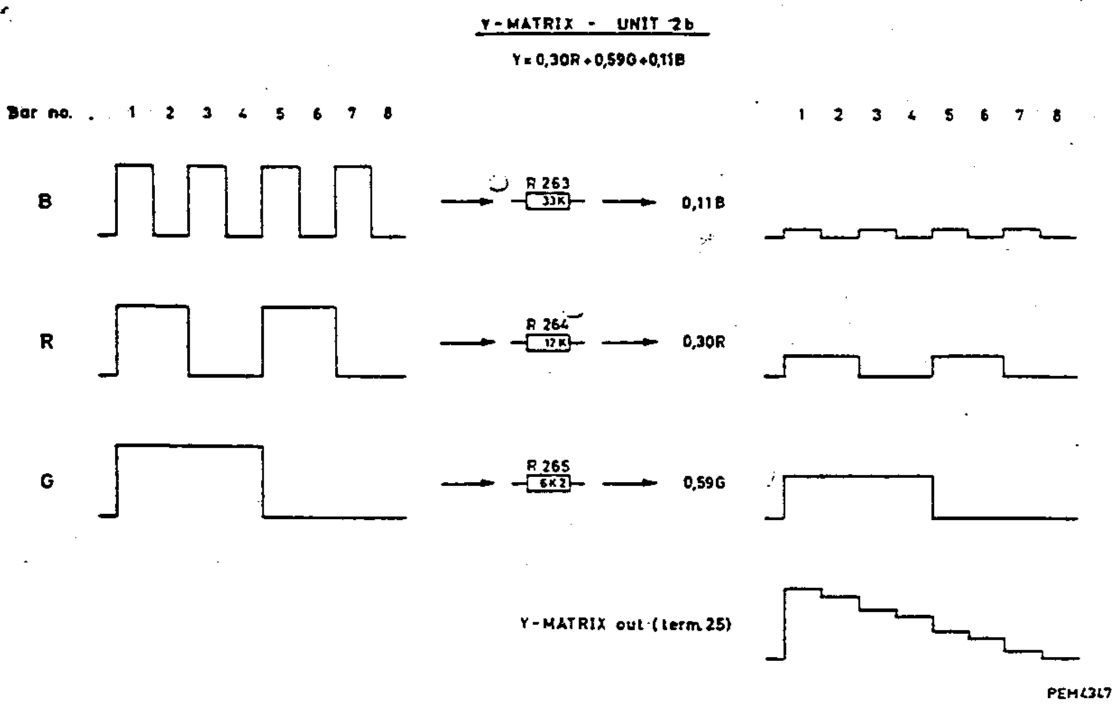


Fig. II-10. Composition of the Y signal

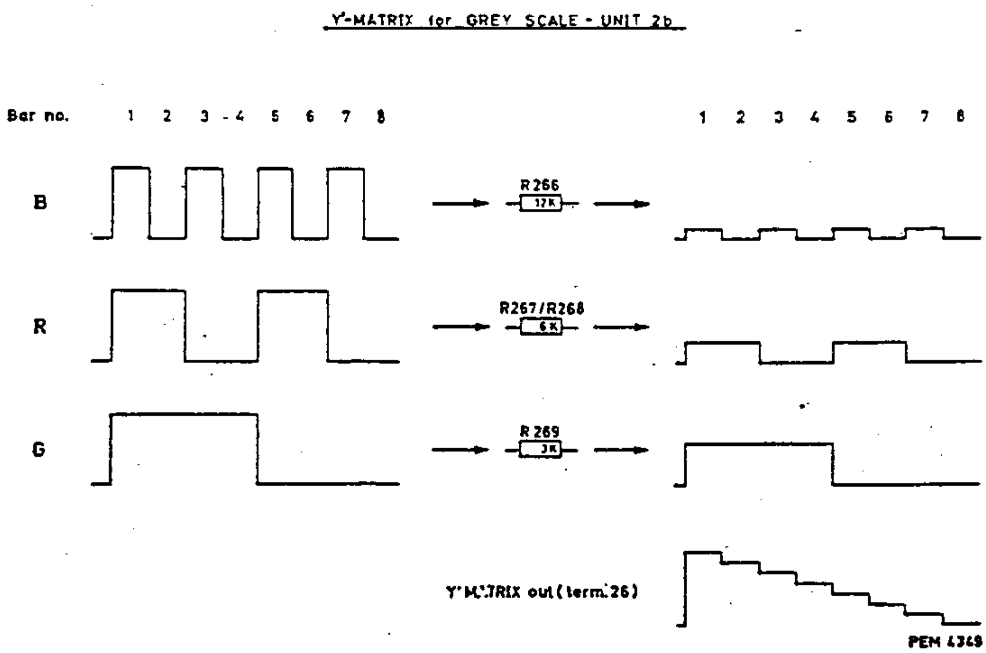


Fig. II-11. Composition of the Y' signal

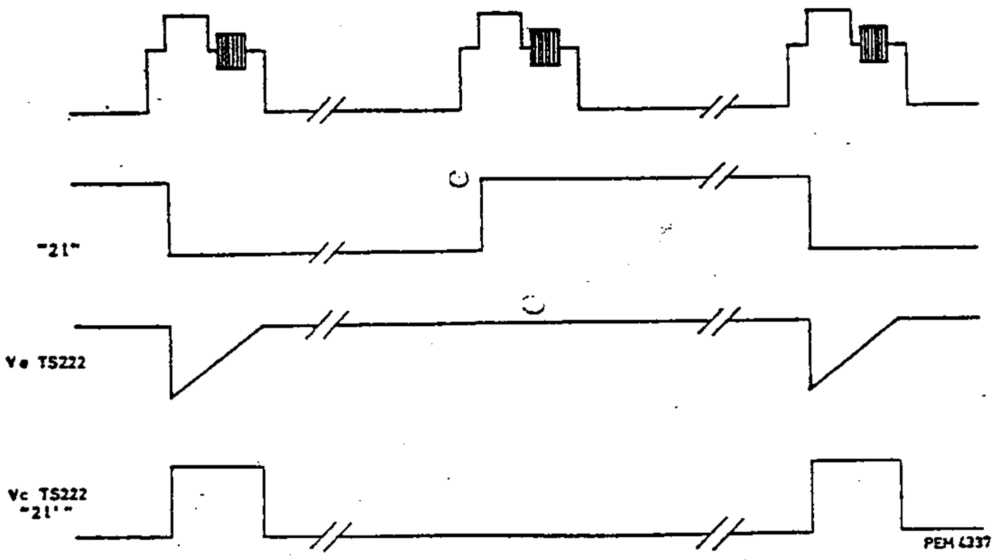


Fig. II-12. Working principle 2 I' generator

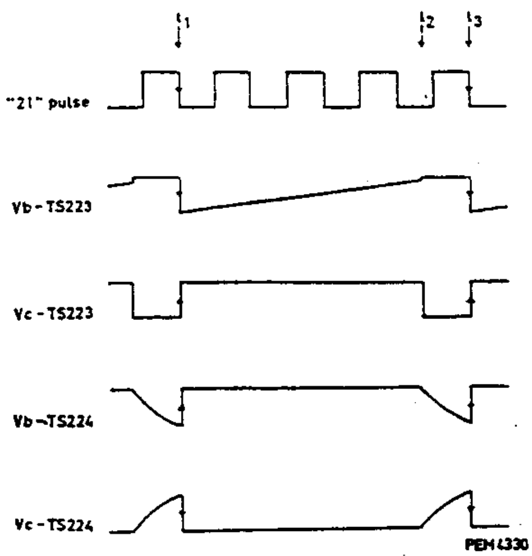
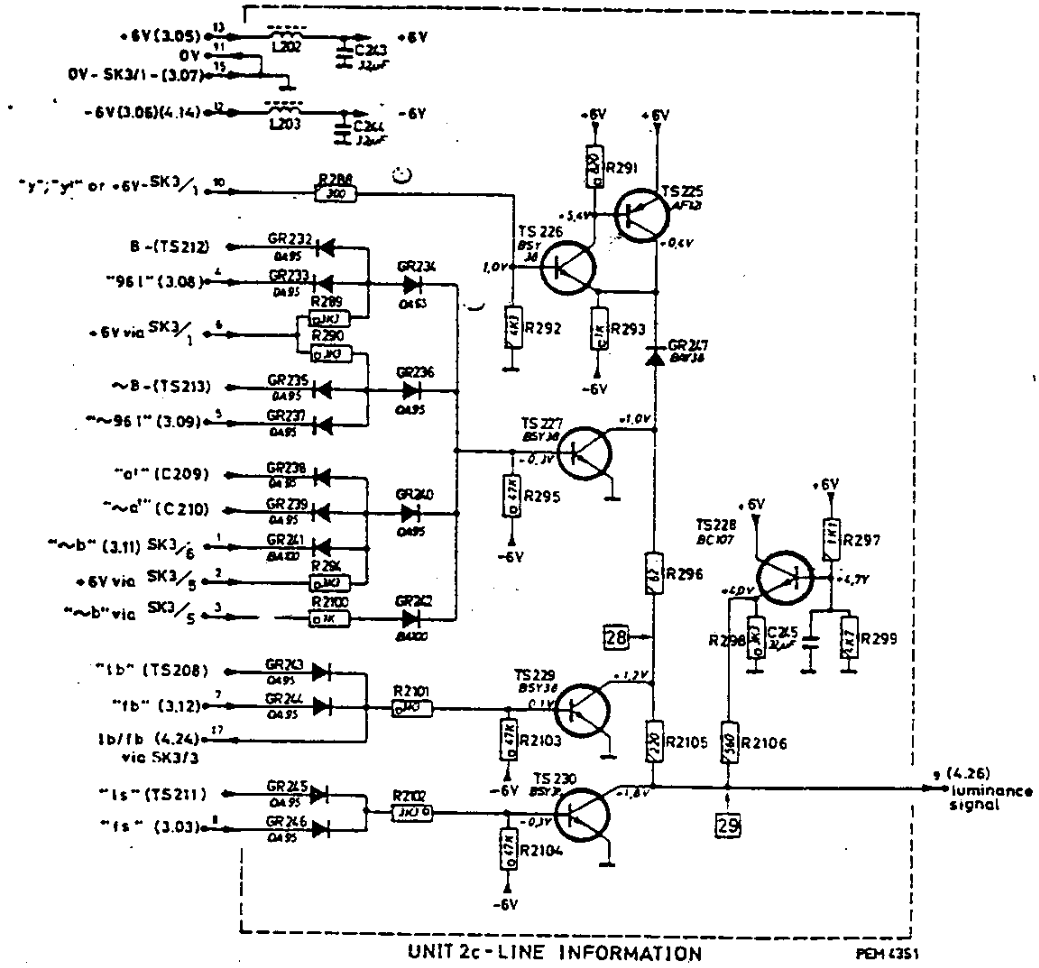


Fig. II-13. Working principle 4 : 1 divider



Erratum: BC 107 → BC 207 B (from version /05)

Fig. II-14. Circuit diagram luminance signal generators, unit 2c

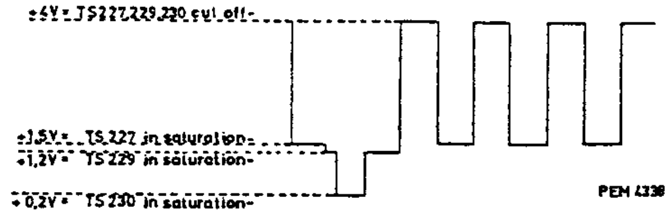


Fig. II-15. D.C. levels of video signal

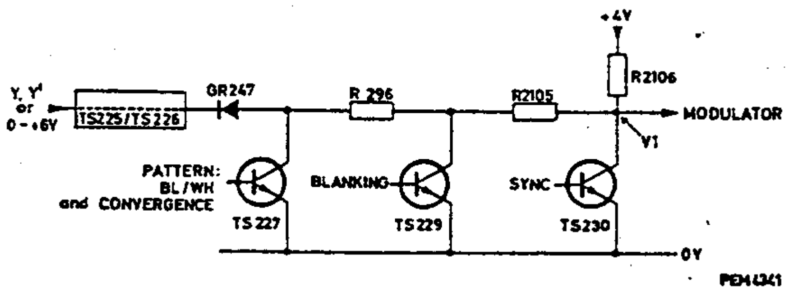


Fig. II-16. Composition of the complete video signal

Luminance signal generators – Unit 2c (see Fig. II-14)

The luminance signal is based on the + 4 V at the emitter of voltage stabilizer TS228.
The different levels of the signal are obtained by dividing the emitter voltage of TS228 (+ 4 V) by means of one of the transistors TS225/TS226/TS227-TS229 or TS230, which are in saturation (see Fig. II-15).
TS225/TS226 form a linear amplifier. The voltage on the emitter of TS227 is practically the same as the voltage on the base (see Fig. II-16).
This amplifier delivers the staircase signal when generating the pictures "GREYSCALE" and "COLOUR BAR".
With SK3 in positions "RED", "DELAY", "PHASE" and "MATRIX" the amplifier will deliver a voltage giving the luminance signal a fixed (grey) level.
With SK3 in positions "BL/WH", "WHITE", and "CONVERGENCE" the amplifier is supplied with + 6 V. This voltage drives GR247 into cut-off.
The voltage at output terminal 9 is thus + 4 V (+ 4 V from emitter TS228).
As shown in Fig. II-15, + 4 V corresponds to white level.
TS227 is the adder circuit for signals "BL/WH" and "CONVERGENCE".
The working principle of the gates in the base circuit of this transistor is shown in Figs. II-17, II-18, II-19 (for positions "BL/WH" and "CONVERGENCE).
GR243/GR244 and GR245/GR246 are OR gates for the blanking and sync. signals.
TS229 supplies the complete blanking, and TS230 the complete sync. signals.

C. FRAME INFORMATION – UNIT 3 (see Fig. II-20)

13 : 1 Divider

Circuit TS301 to TS308 is a binary divider. The output signals ("~312 I" and "312 I") are used for test pattern "PHASE", as well as for controlling the frame sync. generator.
The working principle of the divider is shown in Fig. II-21. By means of (negative) feedback from TS307 via C317 to GR309 and GR311 (time t_1) the applied signal ("~24 I") is divided according to ratio 13 : 1.
Diodes GR310, GR312, GR313, and GR314 form an AND gate.
This gate will control the frame blanking generator via R336.

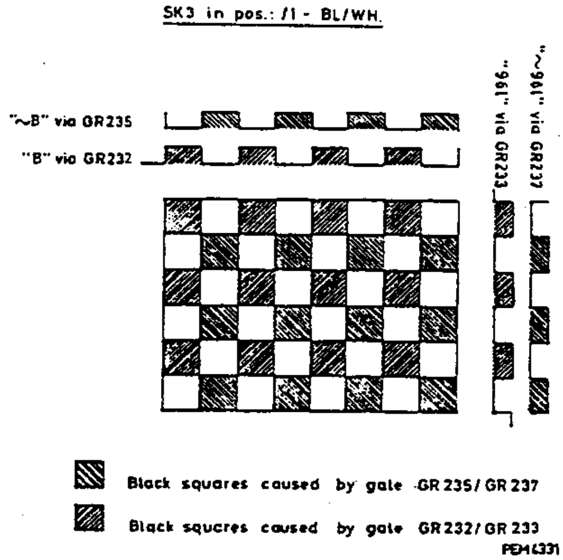


Fig. II-17. Composition of the 'CHECKERBOARD' pattern

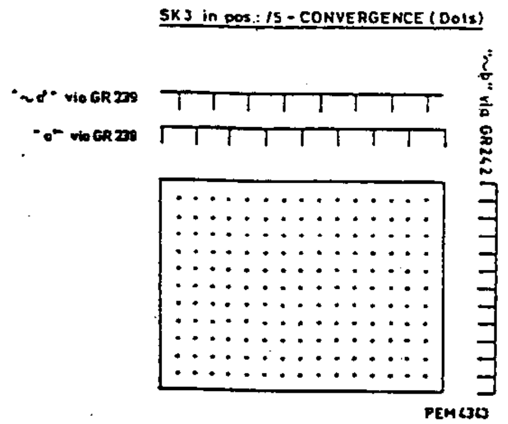


Fig. II-18. Composition of the 'DOTS' pattern

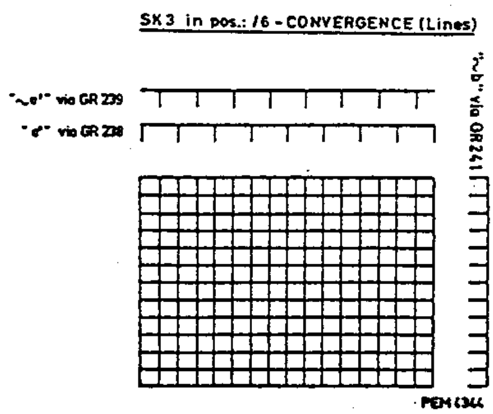


Fig. II-19. Composition of the 'CROSSHATCH' pattern

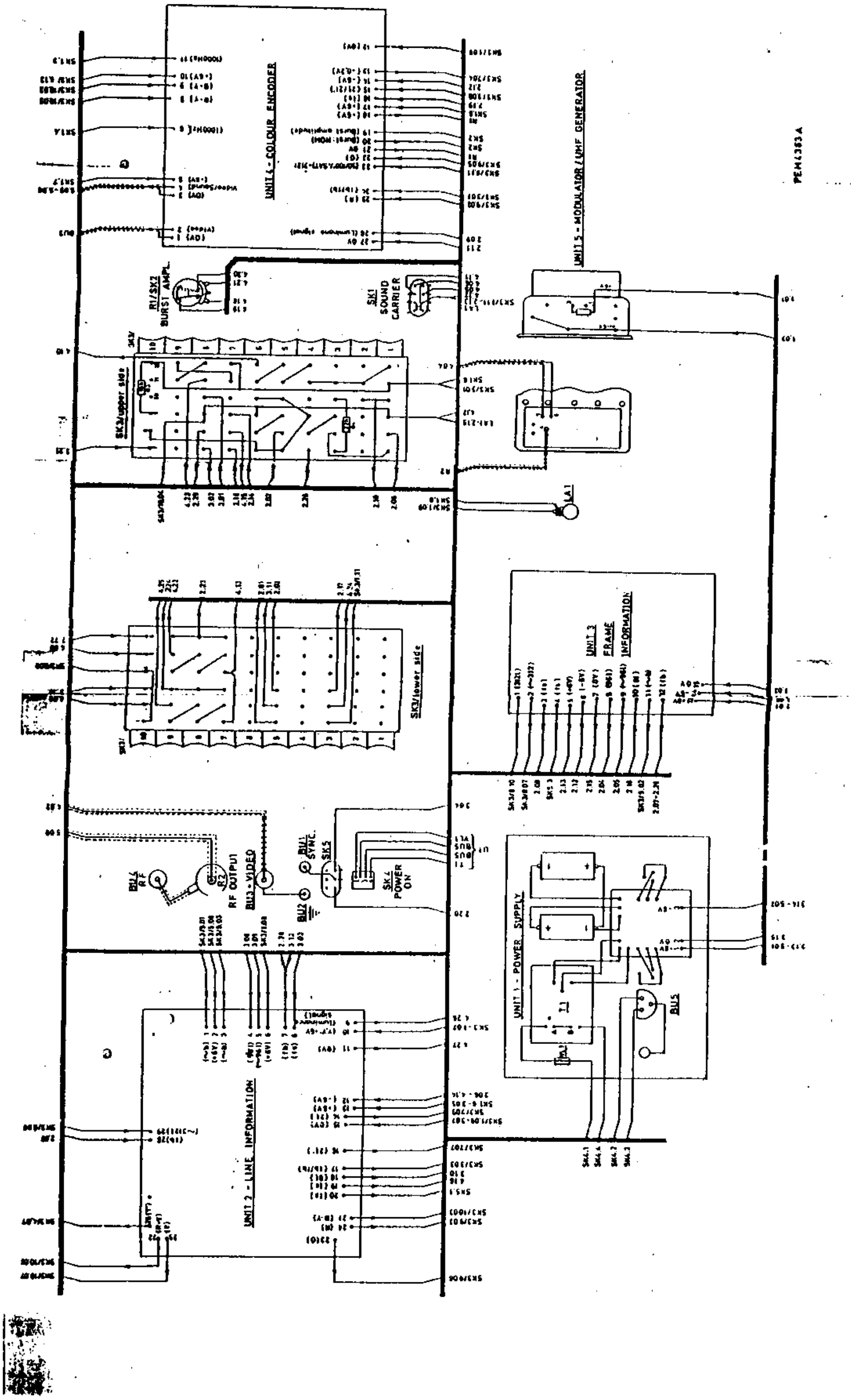


Fig. V-10a General wiring plan (PM 5508)

Luminance signal generators – Unit 2c (see Fig. II-14)

The luminance signal is based on the + 4 V at the emitter of voltage stabilizer TS228.
The different levels of the signal are obtained by dividing the emitter voltage of TS228 (+ 4 V) by means of one of the transistors TS225/TS226/TS227-TS229 or TS230, which are in saturation (see Fig. II-15).
TS225/TS226 form a linear amplifier. The voltage on the emitter of TS227 is practically the same as the voltage on the base (see Fig. II-16).
This amplifier delivers the staircase signal when generating the pictures "GREYSCALE" and "COLOUR BAR".
With SK3 in positions "RED", "DELAY", "PHASE" and "MATRIX" the amplifier will deliver a voltage giving the luminance signal a fixed (grey) level.
With SK3 in positions "BL/WH", "WHITE", and "CONVERGENCE" the amplifier is supplied with + 6 V. This voltage drives GR247 into cut-off.
The voltage at output terminal 9 is thus + 4 V (+ 4 V from emitter TS228).
As shown in Fig. II-15, + 4 V corresponds to white level.
TS227 is the adder circuit for signals "BL/WH" and "CONVERGENCE".
The working principle of the gates in the base circuit of this transistor is shown in Figs. II-17, II-18, II-19 (for positions "BL/WH" and "CONVERGENCE).
GR243/GR244 and GR245/GR246 are OR gates for the blanking and sync. signals.
TS229 supplies the complete blanking, and TS230 the complete sync. signals.

C. FRAME INFORMATION – UNIT 3 (see Fig. II-20)

13 : 1 Divider

Circuit TS301 to TS308 is a binary divider. The output signals ("~312 l" and "312 l") are used for test pattern "PHASE", as well as for controlling the frame sync. generator.
The working principle of the divider is shown in Fig. II-21. By means of (negative) feedback from TS307 via C317 to GR309 and GR311 (time t_1) the applied signal ("~24 l") is divided according to ratio 13 : 1.
Diodes GR310, GR312, GR313, and GR314 form an AND gate.
This gate will control the frame blanking generator via R336.

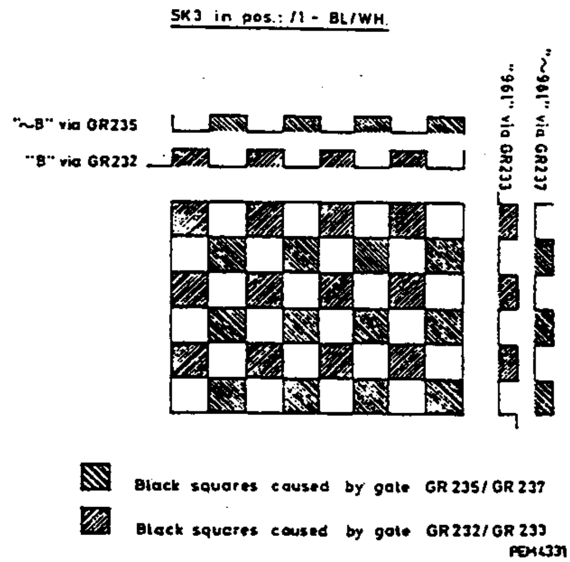


Fig. II-17. Composition of the 'CHECKERBOARD' pattern

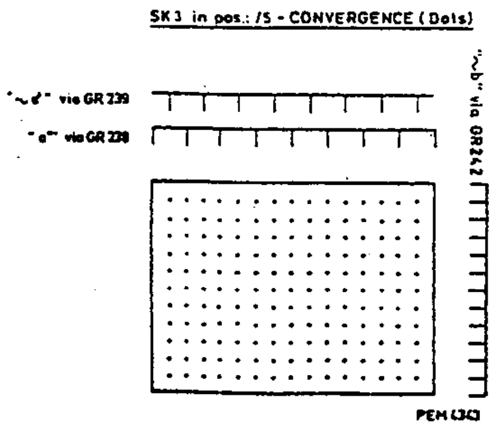


Fig. II-18. Composition of the 'DOTS' pattern

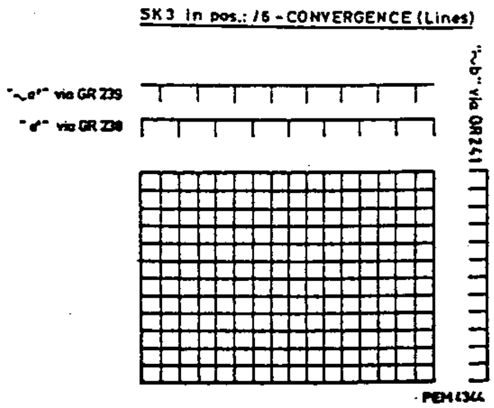
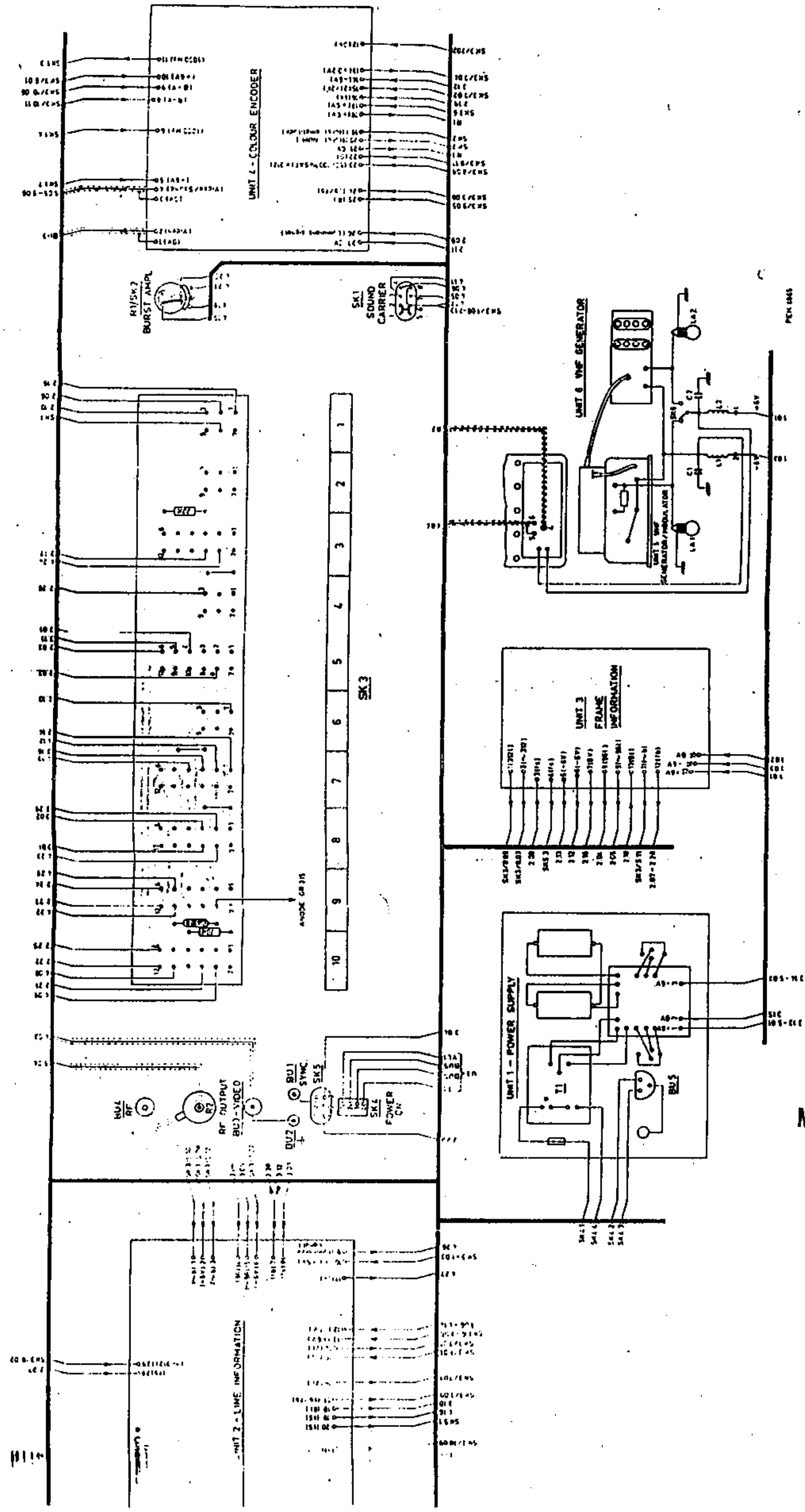


Fig. II-19. Composition of the 'CROSSHATCH' pattern


UNIT 4 - COLOUR ENCODER
BURST AMPL
SK1 SOUND CARRIER
UNIT 6 VHF GENERATOR
SK3
UNIT 3 FRAME INFORMATION
UNIT 1 - POWER SUPPLY
BU1 SYNC
SK5
SK4 POWER ON
RF OUTPUT
BU3-VIDEO
UNIT 2 - LINE INFORMATION

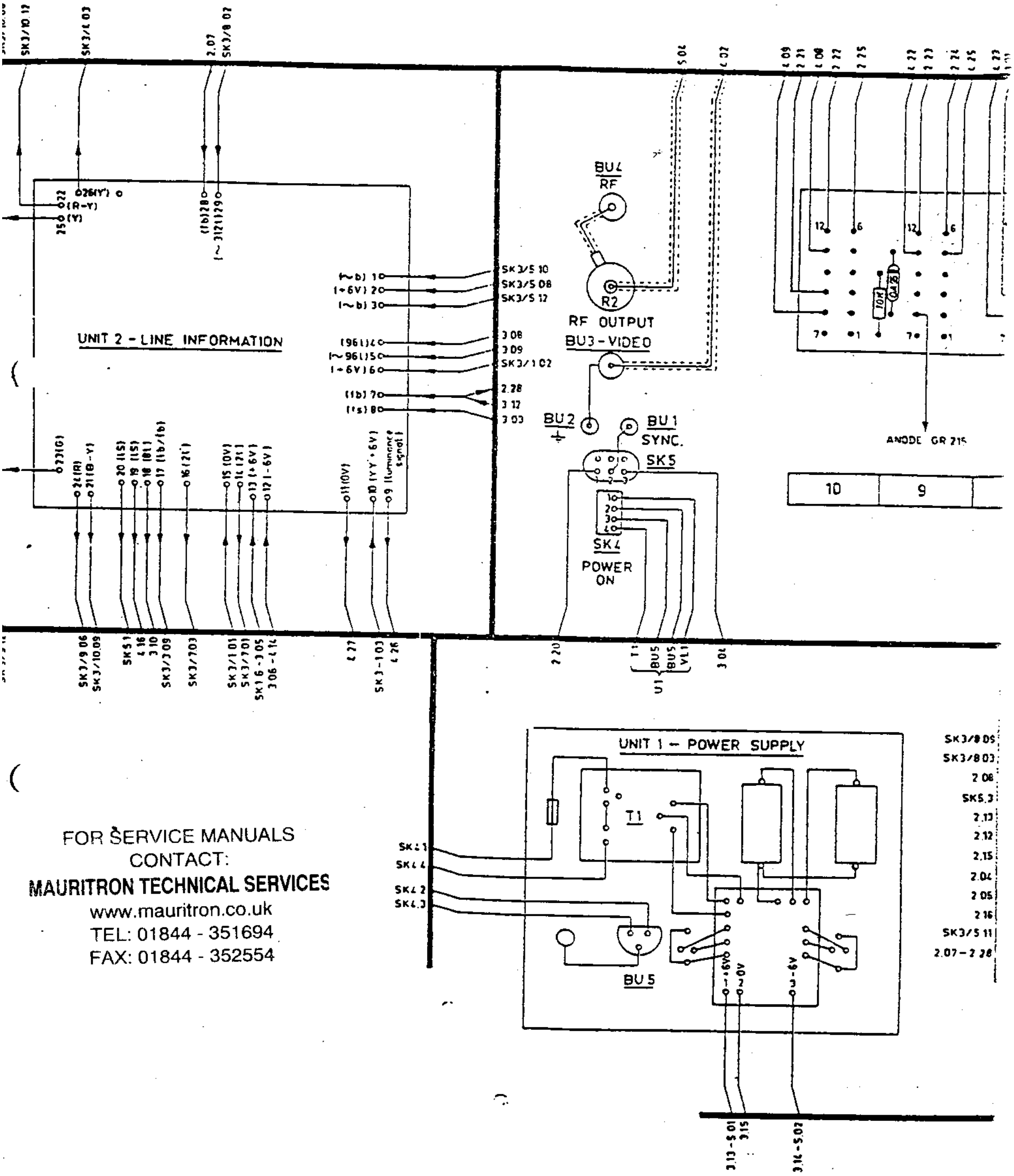
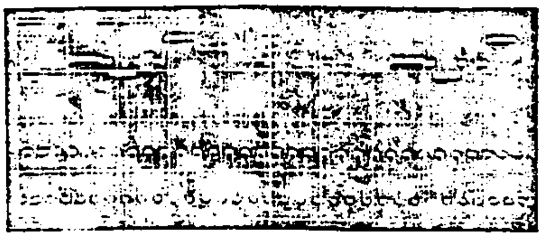
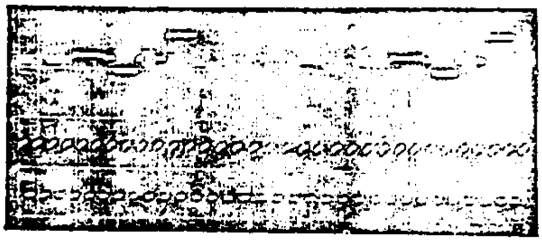


Fig. V-19b. General wiring plan (PM 5508)

F. OSCILLOGRAMS

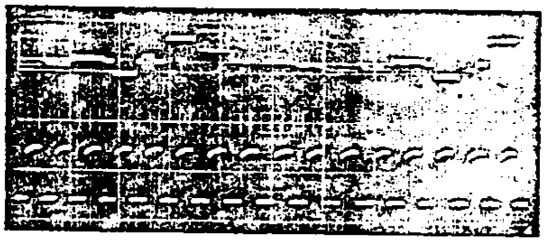


5 V/cm 5 μsec/cm
reference: "COLOUR BAR"

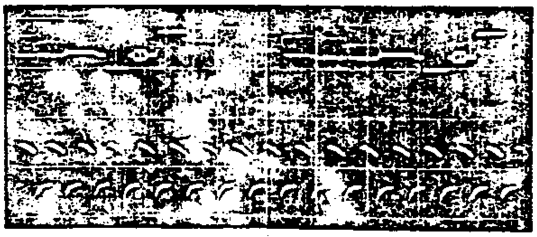


5 V/cm 10 μsec/cm
reference: "COLOUR BAR"

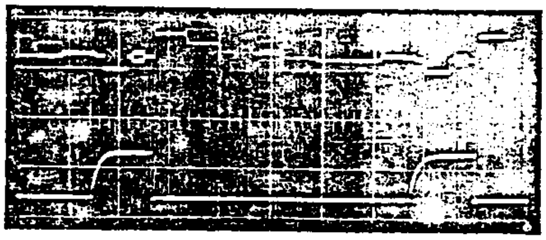
5 V/cm 10 μsec/cm
reference: "COLOUR BAR"



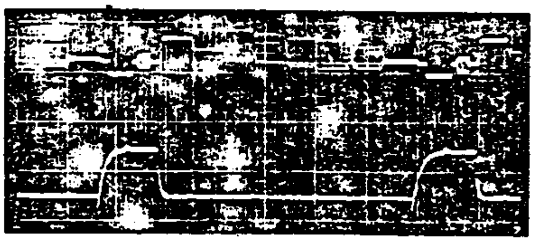
5 V/cm 10 μsec/cm
reference: "COLOUR BAR"



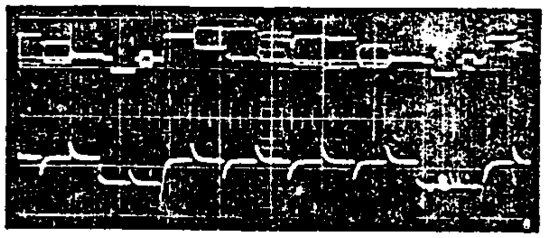
5 V/cm 10 μsec/cm
reference: "COLOUR BAR"



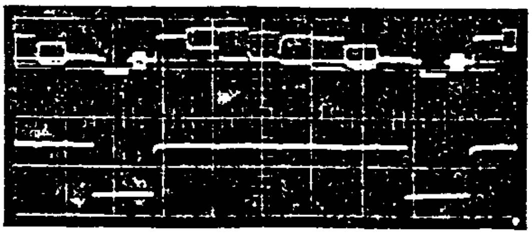
5 V/cm 10 μsec/cm
reference: "COLOUR BAR"



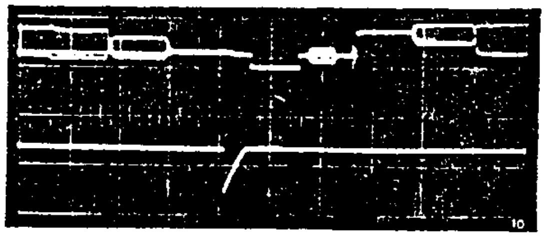
5 V/cm 10 μsec/cm
reference: "COLOUR BAR"



5 V/cm 10 μsec/cm
reference: "COLOUR BAR"

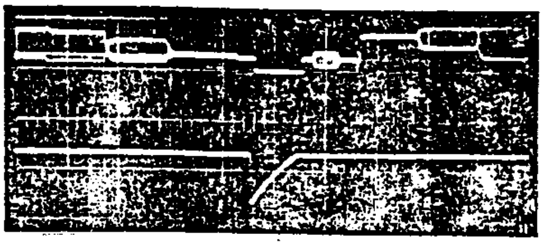


5 V/cm 10 μsec/cm
reference: "COLOUR BAR"

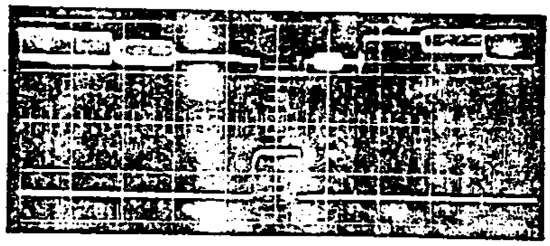


5 V/cm 15 μsec/cm
reference: "COLOUR BAR"

OSCILLOGRAMS - continuous



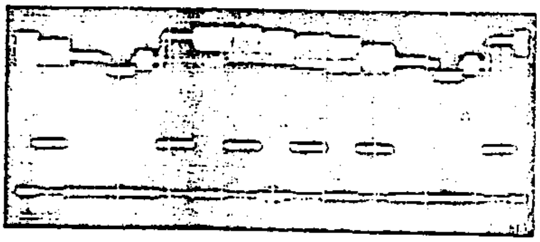
5 V/cm 5 μsec/cm
reference: "COLOUR BAR"



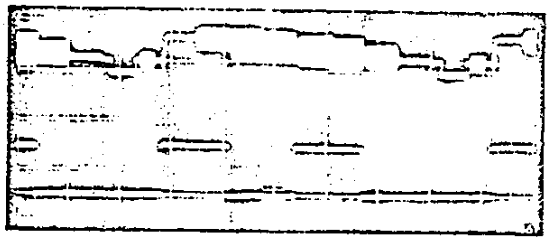
5 V/cm 5 μsec/cm
reference: "COLOUR BAR"

5 V/cm 2 msec/cm
reference: "PHASE"

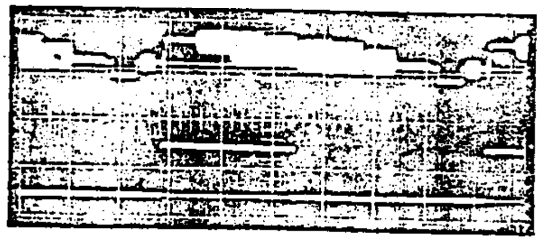
5 V/cm 10 μsec/cm
reference: "COLOUR BAR"



5 V/cm 10 μsec/cm
reference: "COLOUR BAR"

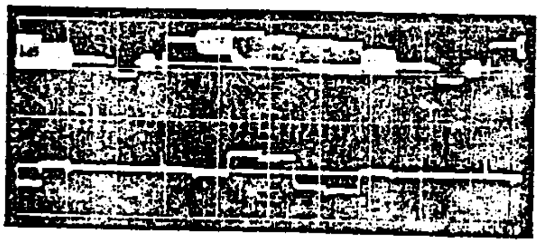


5 V/cm 10 μsec/cm
reference "COLOUR BAR"



5 V/cm 10 μsec/cm
reference: "COLOUR BAR"

5 V/cm 10 μsec/cm
reference: "COLOUR BAR"



5 V/cm 10 μsec/cm
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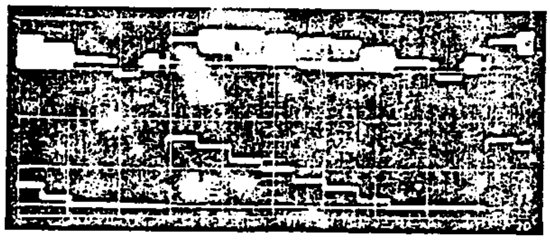
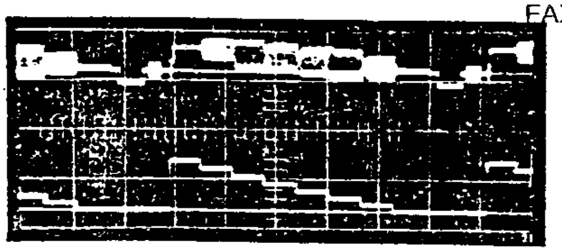
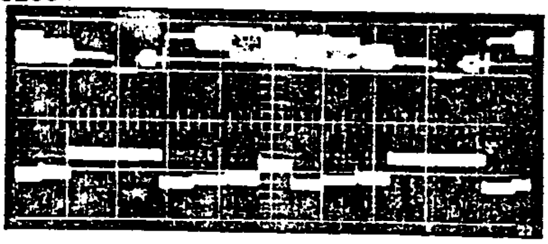


5 V/cm 10 μsec/cm
reference: "COLOUR BAR"

OSCILLOGRAMS - continuous

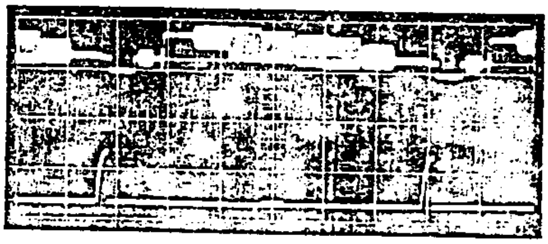


5 V/cm 10 μsec/cm
reference: "COLOUR BAR"

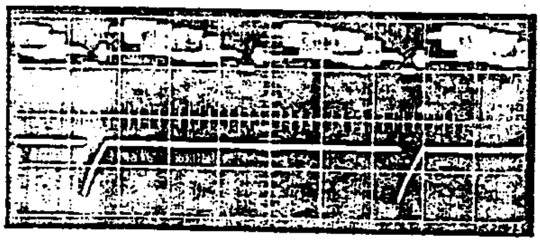


0.5 V/cm 10 μsec/cm
reference: "COLOUR BAR"

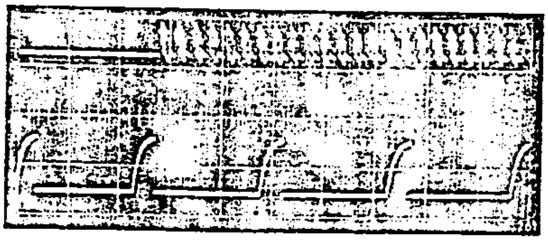
5 V/cm 20 μsec/cm
reference: "COLOUR BAR"



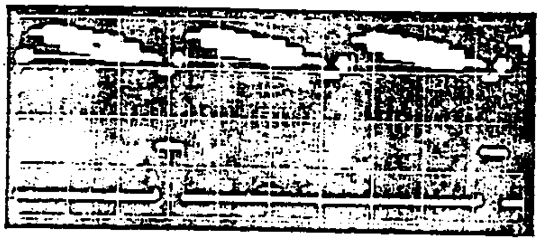
5 V/cm 10 μsec/cm
reference: "COLOUR BAR"



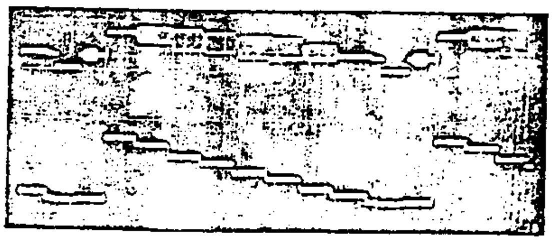
5 V/cm 20 μsec/cm
reference: "COLOUR BAR"



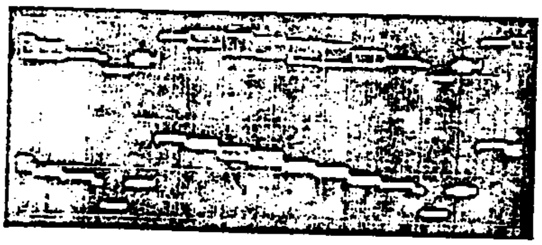
5 V/cm 0.2 msec/cm
reference: "COLOUR BAR"



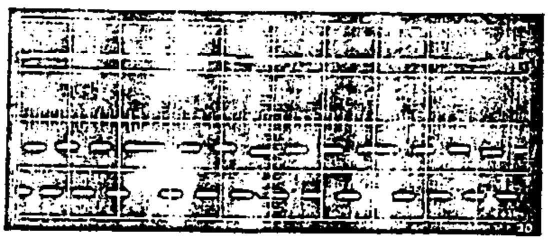
5 V/cm 20 μsec/cm
reference: "COLOUR BAR"



2 V/cm 10 μsec/cm
reference: "COLOUR BAR"

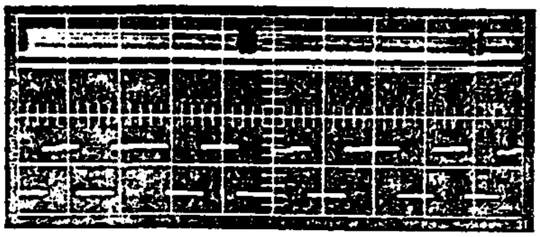


1 V/cm 10 μsec/cm
reference: "COLOUR BAR"

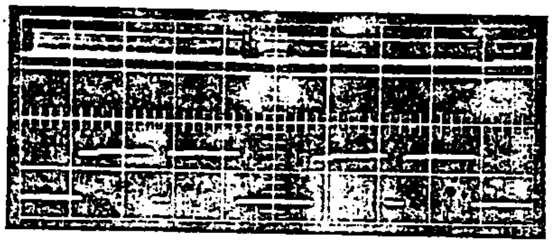


5 V/cm 4 msec/cm
reference: "COLOUR BAR"

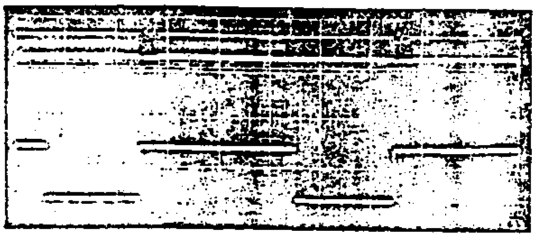
OSCILLOGRAMS - continuous



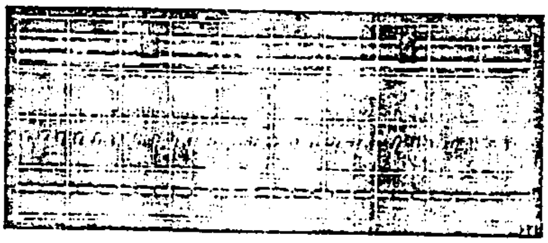
5 V/cm 4 msec/cm
reference: "COLOUR BAR"



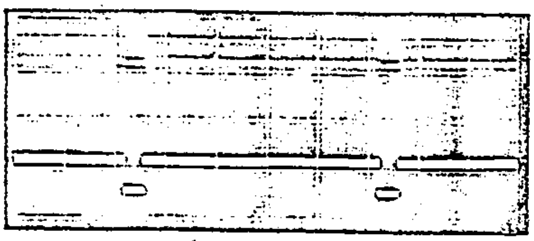
5 V/cm 4 msec/cm
reference: "COLOUR BAR"



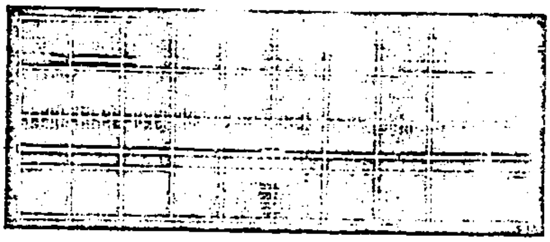
5 V/cm 4 msec/cm
reference. "COLOUR BAR"



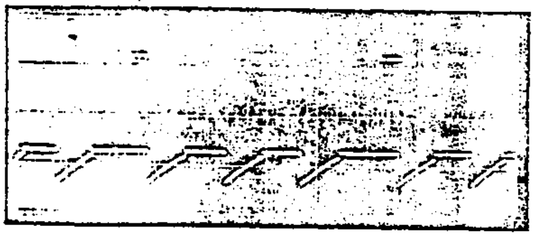
5 V/cm 4 msec/cm
reference: "COLOUR BAR"



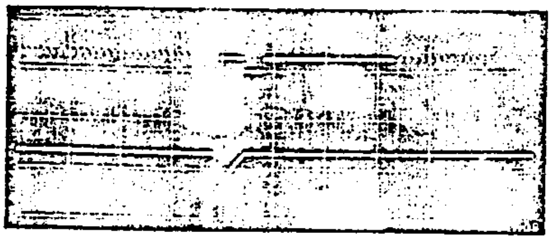
1 V/cm 4 msec/cm
reference: "COLOUR BAR"



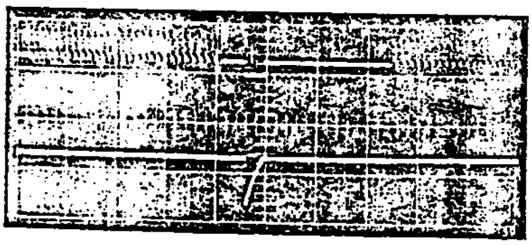
5 V/cm 0.8 msec/cm
reference: "COLOUR BAR"



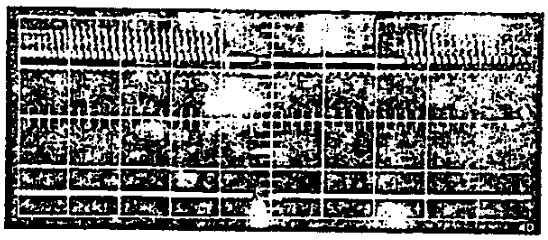
5 V/cm 4 msec/cm
reference: "COLOUR BAR"



5 V/cm 0.4 msec/cm
reference: "COLOUR BAR"

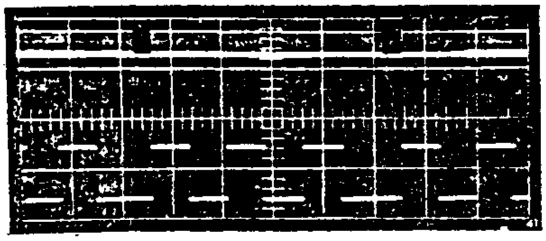


5 V/cm 0.4 msec/cm
reference: "COLOUR BAR"

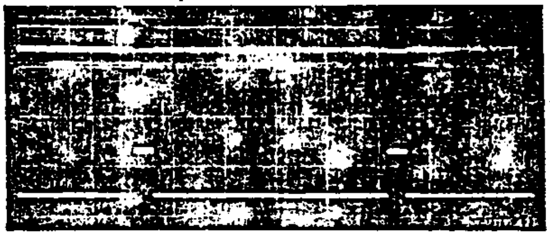


5 V/cm 0.4 msec/cm
reference: "COLOUR BAR"

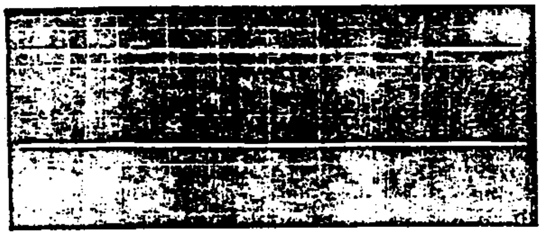
OSCILLOGRAMS - continuous



5 V/cm 4 msec/cm
reference: "COLOUR BAR"

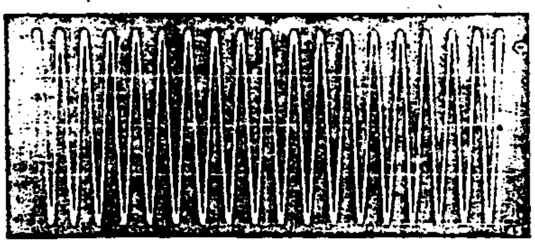


5 V/cm 4 msec/cm
reference: "COLOUR BAR"

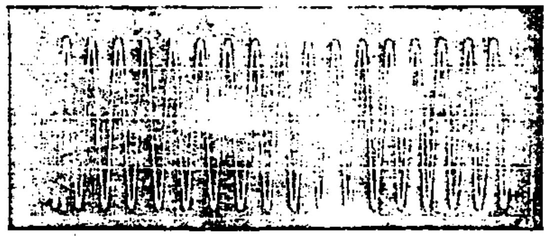


5 V/cm 4 msec/cm
reference: "COLOUR BAR"

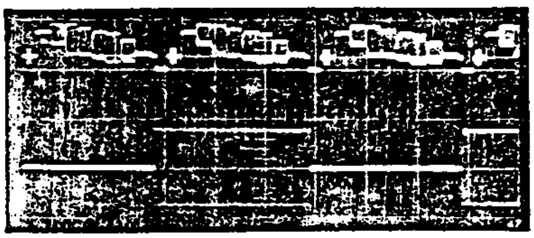
2 V/cm 0.4 μsec/cm



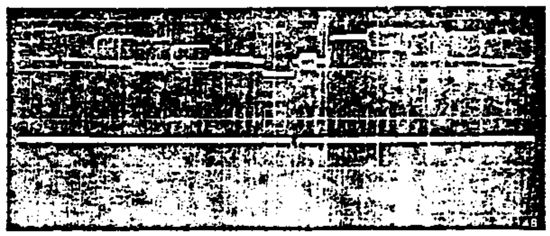
1 V/cm 0.4 μsec/cm



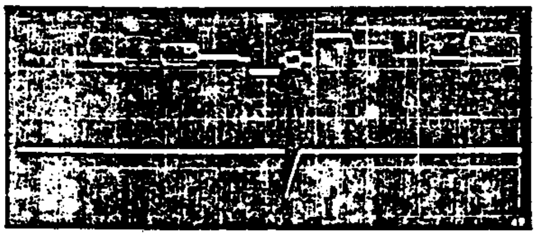
1 V/cm 0.4 μsec/cm



5 V/cm 20 μsec/cm
reference: "COLOUR BAR"



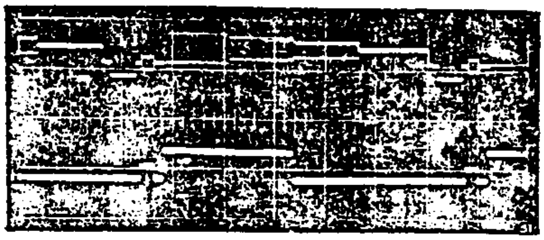
5 V/cm 8 μsec/cm
reference: "COLOUR BAR"



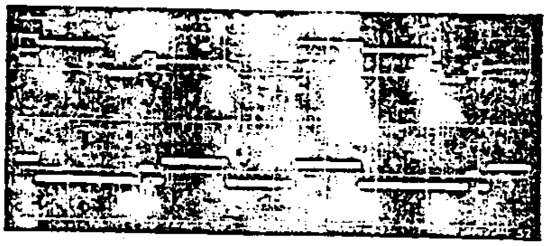
5 V/cm 8 μsec/cm
reference: "COLOUR BAR"

2 V/cm 8 μsec/cm
reference: "COLOUR BAR"

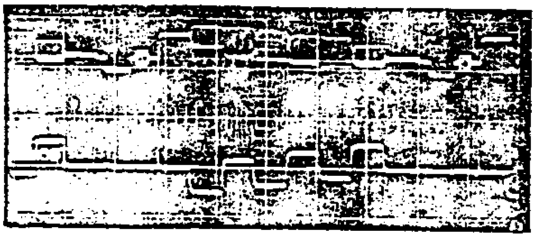
OSCILLOGRAMS - continuous



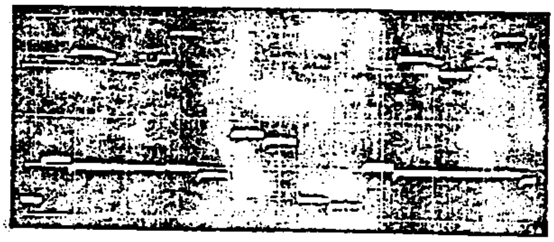
1 V/cm 10 μsec/cm
reference: "MATRIX"



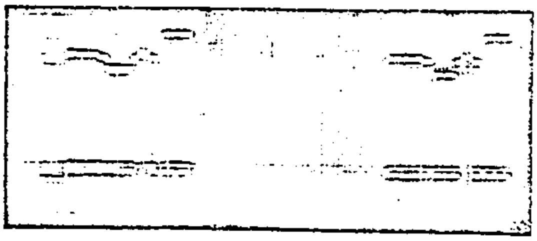
1 V/cm 10 μsec/cm
reference: "MATRIX"



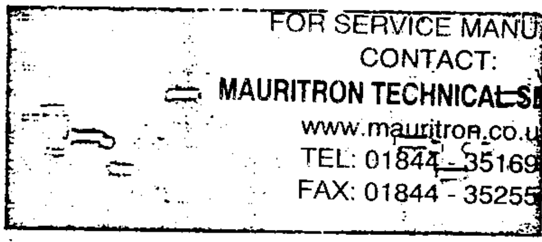
1 V/cm 10 μsec/cm
reference: "COLOUR BAR"



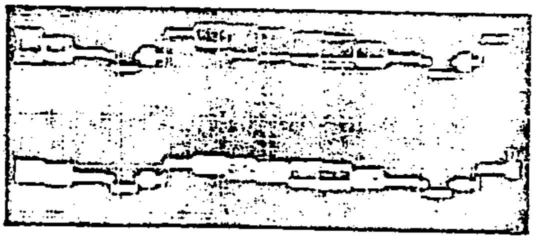
1 V/cm 10 μsec/cm
reference: "COLOUR BAR"



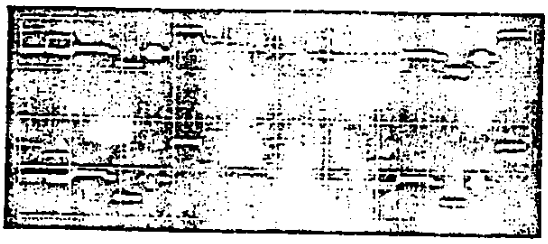
0.5 V/cm 10 μsec/cm
reference: "COLOUR BAR"



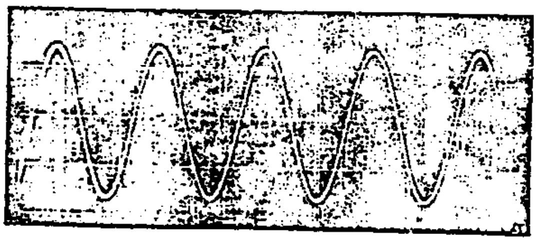
1 V/cm 10 μsec/cm
reference: "COLOUR BAR"



0.5 V/cm 10 μsec/cm
reference: "COLOUR BAR"



1 V/cm 10 μsec/cm
reference: "COLOUR BAR"



2 V/cm 0.4 msec/cm

0.5 V/cm 0.4 msec/cm

VI. LIST OF PARTS

A. MECHANICAL

Fig.	*Item*	*Description*	*Ordering code*
		Text plate (PM 5506)	4822 455 70089
VI-1	1	Text plate (PM 5508)	4822 455 70092
VI-1	2	Knob for R1, R2	4822 413 40211
VI-1	3	Cover for knob	4822 413 70027
VI-1	4	Switch SK1	4822 277 20009
VI-1	5	Switch SK4	4822 277 10021
VI-1	6	Switch SK5	4822 277 20014
		Switch SK6 (PM 5508)	4822 271 30122
		Lens (PM 5506)	4822 381 10039
VI-1	7	Lens (PM 5508)	4822 381 10244
		Push-button switch SK3 (PM 5506)	4822 276 80054
VI-1	8	Push-button switch SK3 (PM 5508)	4822 276 80058
		Push-button unit	4822 276 40025
VI-1	9	Knob for push-button unit	4822 413 30065
VI-1	10	Spring for push-button knob	4822 492 60734
		Pointer guide (PM 5508)	4822 693 70031
VI-1	11	BNC-connector BU3, BU4	4822 267 10004
VI-1	12	4 mm-connector BU1, BU2	4822 267 30045
		Coax plug, miniature	4822 264 10037
		Mains socket	4822 265 30066
VI-1	13	Badge	4822 459 10086
		Switch oil (10 cc)	4822 390 10007
		Foot	4822 462 50101
		Rubber block for feet	4822 462 40157
		Coax plug (miniature, on R2)	4822 267 10039
		Mains plug (female, 3-pole)	4822 266 30057
		Hinge for printed wiring board	4822 417 10165
		Handle bracket	4822 310 10044
		Handle bar	4822 498 50099

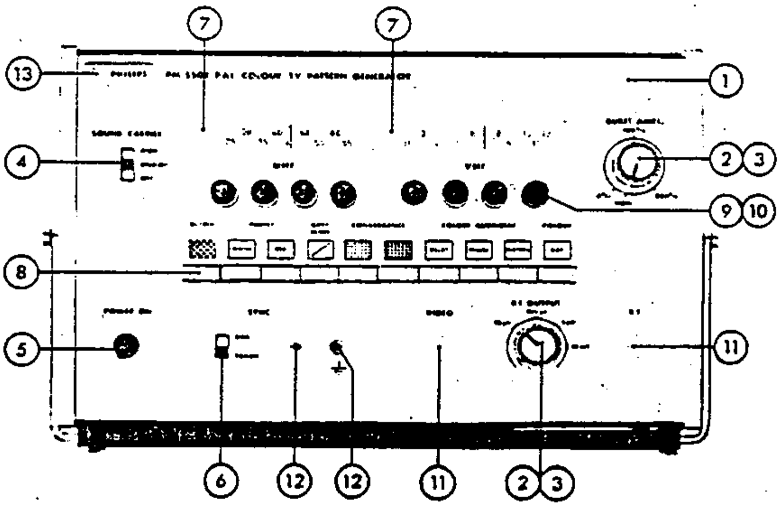


Fig. VI-1. Location of parts (mechanical)

8. ELECTRICAL — ELEKTRISCH — ELEKTRISCH — ELECTRIQUE — ELECTRICOS

This parts list does not contain multi-purpose and standard parts. These components are indicated in the circuit diagram by means of identification marks. The specification can be derived from the survey below.

Diese Ersatzteilliste enthält keine Universal- und Standard-Teile. Diese sind im jeweiligen Prinzipschaltbild mit Kennzeichnungen versehen. Die Spezifikation kann aus nachstehender Übersicht abgeleitet werden.

In deze stuklijst zijn geen universele en standaardonderdelen opgenomen. Deze componenten zijn in het principeschema met een merkteken aangegeven. De specificatie van deze merktekens is hieronder vermeld.

La présente liste ne contient pas des pièces universelles et standard. Celles-ci ont été repérées dans le schéma de principe. Leurs specifications sont indiquées ci-dessous.

Esta lista de componentes no comprende componentes universales ni standard. Estos componentes están provistos en el esquema de principio de una marca. El significado de estas marcas se indica a continuación.

Carbon resistor E24 series
Kohleschichtwiderstand, Reihe E24
Koolweerstand E24 reeks
Résistance au carbone, série E24
Resistencia de carbón, serie E24
— 0,125 W 5%

Carbon resistor E12 series
Kohleschichtwiderstand, Reihe E12
Koolweerstand E12 reeks
Résistance au carbone, série E12
Resistencia de carbón, serie E12
— 0,25 W ≦ 1 MΩ, 5%; > 1 MΩ, 10%

Carbon resistor E24 series
Kohleschichtwiderstand, Reihe E24
Koolweerstand E24 reeks
Résistance au carbone, série E24
Resistencia de carbón, serie E24
— 0,5 W ≦ 5 MΩ, 1%; > 5 ≦ 10 MΩ, 2%; > 10 MΩ, 5%

Carbon resistor E12 series
Kohleschichtwiderstand, Reihe E12
Koolweerstand E12 reeks
Résistance au carbone, série E12
Resistencia de carbón, serie E12
— 0,5 W ≦ 1,5 MΩ, 5%; > 1,5 MΩ, 10%

Carbon resistor E12 series
Kohleschichtwiderstand, Reihe E12
Koolweerstand E12 reeks
Résistance au carbone, série E12
Resistencia de carbón, serie E12
— 1 W ≦ 2,2 MΩ, 5%; > 2,2 MΩ, 10%

Carbon resistor E12 series
Kohleschichtwiderstand, Reihe E12
Koolweerstand E12 reeks
Résistance au carbone, série E12
Resistencia de carbón, serie E12
— 2 W 5%

Wire-wound resistor
Drahtwiderstand
Draadgewonden weerstand
Résistance bobinée
Resistencia bobinada
— 0,4 – 1,8 W 0,5%

Wire-wound resistor
Drahtwiderstand
Draadgewonden weerstand
Résistance bobinée
Resistencia bobinada
— 5,5 W ≦ 200 Ω, 10%; > 200 Ω, 5%

Wire-wound resistor
Drahtwiderstand
Draadgewonden weerstand
Résistance bobinée
Resistencia bobinada
— 10 W 5%

Tubular ceramic capacitor
Rohrkondensator
Keramische kondensator, buistype
Condensateur céramique tubulaire
Condensador cerámico tubular
— 500 V

Tubular ceramic capacitor
Rohrkondensator
Keramische kondensator, buistype
Condensateur céramique tubulaire
Condensador cerámico tubular
— 700 V

Ceramic capacitor, "pin-up"
Keramikkondensator "Pin-up" (Perltyp)
Keramische kondensator "Pin-up" type
Condensateur céramique, type perle
Condensador cerámico, versión "colgable"
— 500 V

"Microplate" ceramic capacitor
Miniatur-Scheibenkondensator
"Microplate" keramische kondensator
Condensateur céramique "microplate"
Condensador cerámico "microplaca"
— 30 V

Mica capacitor
Glimmerkondensator
Micakondensator
Condensateur au mica
Condensador de mica
— 500 V

Polyester capacitor
Polyesterkondensator
Polyesterkondensator
Condensateur au polyester
Condensador polyester
— 400 V

Flat-foil polyester capacitor
Miniatur-Polyesterkondensator (flach)
Platte miniatuur polyesterkondensator
Condensateur au polyester, type plat
Condensador polyester, tipo de placas planas
— 250 V

Paper capacitor
Papierkondensator
Papierkondensator
Condensateur au papier
Condensador de papel
— 1000 V

Wire-wound trimmer
Drahttrimmer
Draadgewonden trimmer
Trimmer à fil
Trimmer bobinado

Tubular ceramic trimmer
Rohrtrimmer
Buisvormige keramische trimmer
Trimmer céramique tubulaire
Trimmer cerámico tubular

SERVICE

For multi-purpose and standard parts, please see PHILIPS' Service Catalogue.
Für die Universal- und Standard-Teile siehe den PHILIPS Service-Katalog.
Voor universele en standaardonderdelen raadplege men de PHILIPS Service Catalogus.
Pour les pièces universelles et standard veuillez consulter le Catalogue Service PHILIPS.
Para piezas universales y standard consulte el Catálogo de Servicio PHILIPS.

B. ELECTRICAL

Item	*Description*	*Ordering code*
R1	Potentiometer, 1 kΩ lineair	4822 101 40024
R2	Potentiometer, 75 Ω (Preh)	4822 105 40003
LA1, LA2	Pilot lamp	4822 134 40005
T1	Mains transformer (PM 5506)	4822 145 30065
T1	Mains transformer (PM 5508)	4822 145 40087
VL1	Safety fuse, 200 mA delayed	4822 253 30012
C1, 2	Electrolytic capacitor, 1250 μF, 25 V	4822 124 70022
L201	Oscillator coil	4822 156 20476
L202, 203	Coil	4822 158 10052
C219, 239	Polystyrene capacitor, 680 pF, 160 V, 1%	4822 121 50367
C222	Polystyrene capacitor, 820 pF, 160 V, 1%	4822 121 50368
C243, 244, 245	Electrolytic capacitor, 32 μF, 10 V	4822 124 20073
L301	Coil	4822 158 10052
C321	Polystyrene capacitor, 150 kpF, 63 V	4822 121 50275
C327	Electrolytic capacitor, 32 μF, 10 V	4822 124 20073
R330	Resistor, 10.5 k Ω, 1%	4822 116 50731
LA401	Lamp (7121 D)	4822 134 40003
L401, 402, 412	Coil	4822 158 10052
L403, 411	Coil	4822 156 20345
L404, 406	Coil	4822 158 10057
L405, 410	Coil	4822 157 30112
L407, 409	Coil	4822 157 30023
L408	Delay cable (20 cm)	4822 320 40025
T401, 402, 403, 404	Transformer	4822 158 30128
C401, 402	Electrolytic capacitor, 400 μF, 10 V	4822 124 20074
C407, 424, 427	Trimmer, 8 pF	4822 125 50015
C411, 418, 447	Polystyrene capacitor, 330 pF, 160 V, 1%	4822 121 50369
C413, 430	Trimmer, 60 pF	4822 125 50011
C415, 419	Electrolytic capacitor, 10 μF, 16 V	4822 124 20077
C417	Polystyrene capacitor, 220 pF, 160 V, 1%	4822 121 50371
C434	Ceramic capacitor, 1.5 kpF, 1%	4822 120 60112
C439	Electrolytic capacitor, 32 μF, 10 V	4822 124 20073
C443	Electrolytic capacitor, 200 μF, 10 V	4822 124 20072
C444	Electrolytic capacitor, 125 μF, 16 V	4822 124 20078
C446	Polystyrene capacitor, 1 kpF, 500 V, 1%	4822 121 50186
R437, 447, 452, 454	Potentiometer, 10 kΩ	4822 101 10007
R473	Potentiometer, 1 kΩ	4822 101 10005
R488	Potentiometer, 2.2 kΩ	4822 101 10009
R499	Potentiometer, 22 kΩ	4822 101 10074
R4105	Potentiometer, 470 Ω	4822 101 10048
KT401	Crystal, 4.433619 MHz	4822 242 70136

Semi-conductors:

AC126	4822 130 40236	BSY38	4822 130 40138
AC127/AC132	4822 130 40406	AAY21	4822 130 30087
AD161	4822 130 40212	AAZ15	4822 130 30299
AF121	4822 130 40385	BA100	4822 130 30226
ASY75	4822 130 40264	BA114	4822 130 30189
ASZ16	4822 130 40279	BAY38	4822 130 40256
BC107 (Versions 01 ÷ 04)	4822 130 40184	BZY59	4822 130 30132
BC207 B (from version 05)	4822 130 40799	BA95	4822 130 30191
BF109	4822 130 40239	BY122	4822 130 30261
BF115	4822 130 40308	GR501 ÷ GR502 (Selected pair)	4822 130 30665

Fig.	Item	Description	Ordering code
	Unit 1	Power supply unit	4822 212 80072
	Unit 2	Line information unit	4822 212 80068
	Unit 3	Frame information unit	4822 212 80069
	Unit 4	Colour encoder unit	4822 212 80071
	Unit 5	UHF generator (PM 5506)	4822 210 50061
		UHF generator (PM 5508)	4822 210 50063
		Gear-wheel for UHF generator	4822 522 30313
	Unit 6	VHF generator (PM 5508)	4822 210 40101
		Modulator (PM 5506)	4822 216 60103
		Modulator (PM 5508)	4822 212 80074
Accessories:		B & L plug (B-version only)	4822 264 10037
		VHF-Adaptor	4822 263 50027
		UHF-Adaptor	4822 263 50026
Parts of matching transformer:		Transformer	4822 158 10035
		75 Ω-cable (1 m)	4822 320 10028
		BNC-connector	4822 265 10003
		Casing	4822 423 30025

III. ACCESS TO AND REPLACEMENT OF PARTS

A. REMOVING THE PANELS

1. Remove the top panel (one screw at the rear).
2. Remove the bottom panel (two screws).
3. Remove the handle (two screws).
4. Remove the left and right-hand side panels (no screws).

Now the printed wiring boards are accessible.
A printed board can be hinged out when the two screws holding it are removed.

B. REMOVING THE KNOBS (see Fig. III-1)

1. Remove cap A.
2. Loosen nut B and tap it ligthly while holding the knob.
3. The knob can the be slid off the spindle.

C. REMOVING THE TEXT PLATE

1. Remove the panels as indicated in section A.
2. Remove the two feet which hold the surrounds by loosening first the two grub screws.
3. Remove the knobs from R1 and R2 (section B).
4. Remove the fixing nut which holds the mains switch.
5. The text plate can then be taken off.

Now the push-button unit, pattern selector switch, RF output attenuator, etc. are accessible.

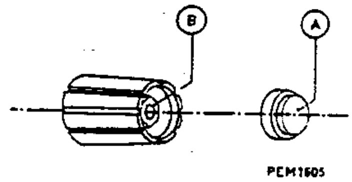


Fig. III-1. Removing the knobs

IV. MAINTENANCE

A. PUSH-BUTTON SWITCH

Should the switch cease functioning properly due to dirty contacts, they should be treated with switch oil (see list of mechanical parts). This oil has both cleaning and lubricating properties. After using this oil, the switch should be operated a few times.

B. PANELS

The P.V.C. coated panels may be cleaned with soap and water (first remove the panels, chapter III). If necessary, a fine scouring agent may be used.

V. CHECKING AND ADJUSTING

A. POWER SUPPLY – UNIT 1 (see Fig. V-1)

Measuring instruments to be used:

mA-meter	e.g.: PHILIPS multimeter PM 2411
DC millivoltmeter	e.g.: PHILIPS PM 2430
Oscilloscope	e.g.: PHILIPS PM 3230

1. The current consumption at 220 V, 50 Hz should not exceed 70 mA (instrument adjusted to 230 V).
2. Connect the millivoltmeter to terminals 1 and 2 (terminal 2 is common).
   The voltage should be + 5.8 V ± 0.3 V.
3. Connect the millivoltmeter to terminals 3 and 2. The voltage should be — 6.4 V ± 0.3 V.
4. The voltages between terminals 1 and 2 and between terminals 2 and 3 should not vary more than 0.1 V at a mains voltage variation from 180 V to 280 V (instrument adjusted to 230 V).
5. Depress SK3/1 "BL/WH".
   The ripple voltage on terminal 1 should not exceed 8 mV_{p-p} and on terminal 3 not exceed 4 mV_{p-p} (both measured with respect to terminal 2).

B. LINE INFORMATION – UNIT 2 (see Fig. V-2)

Measuring instruments to be used:
Counter or double beam oscilloscope:
e.g. PHILIPS PM 3230, and a proper functioning black/white or colour receiver.

Adjusting the master oscillator

Connect the counter to BU1 "SYNC" and BU2 (common) and set SK5 to position "LINE".
The line time should be 64.00 μsec. ± 0.1 μsec.
If not, adjust to the correct time by means of L201.
If no counter is available, a double beam oscilloscope can be used:
Connect the A amplifier to the sync. separator output in a TV-receiver set to a local TV-station.
Connect the B amplifier to BU1.
The interval between the line sync. pulses should be the same for the A and B signals.
If not, adjust L201 to the correct time.

C. COLOUR ENCODER – UNIT 4 (see Fig. V-3)

Counter	: up to approx. 4.5 MHz
Vectorscope	: e.g. TEKTRONIX type 526, Mod. 158 M
Oscilloscope	: e.g. PHILIPS PM 3330 + PM 3332
DC millivoltmeter	: e.g. PHILIPS PM 2430
Modulation-meter	: e.g. RADIOMETER AFM1
Crystal	: 5.5 or 6.0 MHz

1. Adjusting the subcarrier oscillator

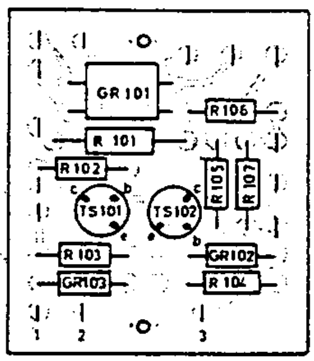
Depress push-button SK3/7 "DELAY".
Connect the counter to the collector of TS404. The frequency indicated should be 4433619 Hz ± 4 Hz.
If not, adjust C407 to the correct frequency.
After this adjustment the following check must be carried out.
Connect the oscilloscope to the collector of TS404.
Check that L403 is tuned to maximum subcarrier output.
Check and if necessary, adjust the balance of the (R-Y) and (B-Y) modulators (section 3) before the adjustments mentioned in sections 2, 5, 6 and 7 are carried out.

2. Adjusting the 90° phase shift

Adjust the pattern generator as indicated below:

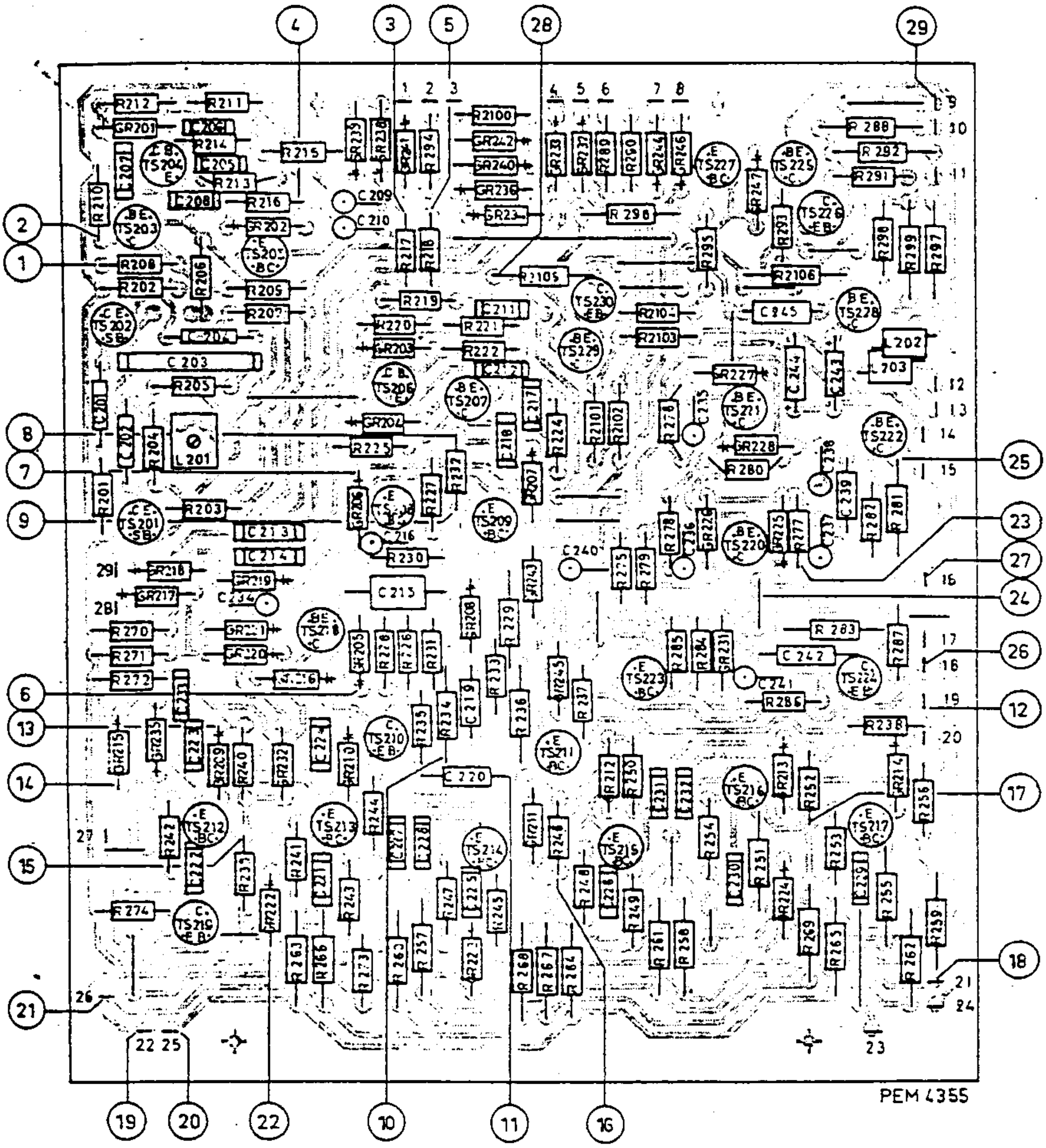
SK1	– "SOUND CARRIER"	:	"OFF"
R2/SK2	– "BURST AMPL."	:	"NOM." (100%)
SK3/9	– "MATRIX"	:	depressed
SK5	– "SYNC."	:	"LINE"

Connect the oscilloscope to output "VIDEO" (BU3) terminated with 75 Ω.
Trigger the oscilloscope externally with the signal from socket "SYNC." (BU1).
Adjust the time-base control of the oscilloscope until two TV-lines coincide.
The amplitude of the chrominance signal should be the same for the two lines.
If not, adjust C413 until the two TV-lines have the same amplitude.



PEM4345

Fig. V-1. Printed wiring board, power supply



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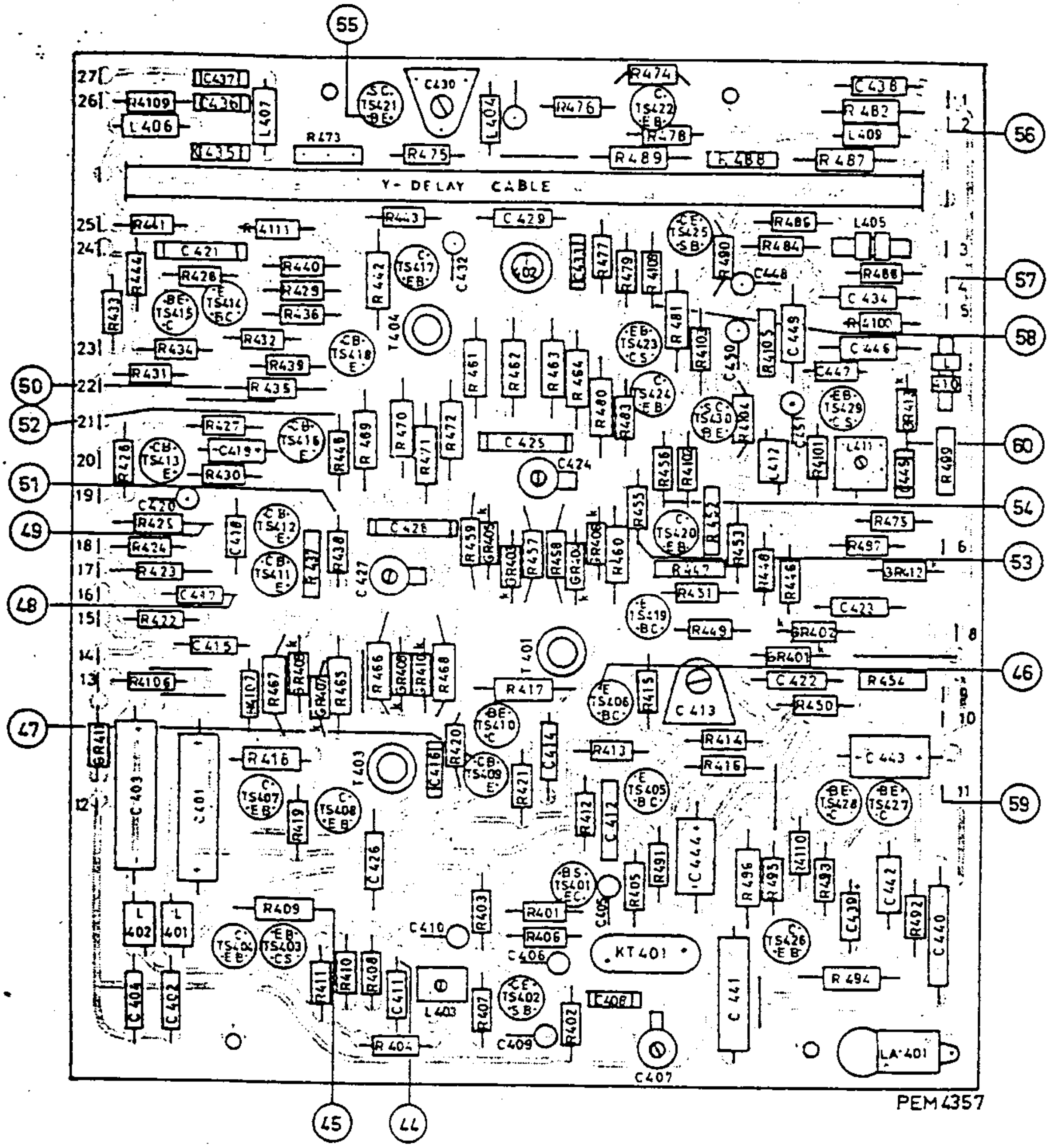
FAX: 01844 - 352554

Fig. V-2. Printed wiring board, line information, unit 2



PEM 4357

Erratum: R 4112 par. to R 484

Fig. V-3. Printed wiring board, colour encoder, unit 4

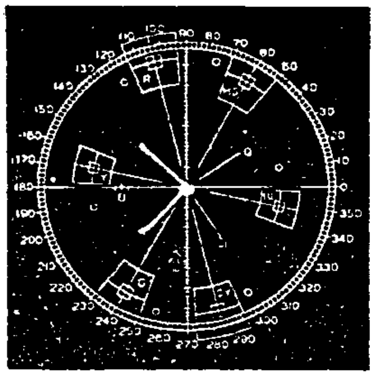


Fig. V-4. Vectorscope display showing signal in case of properly balanced modulators

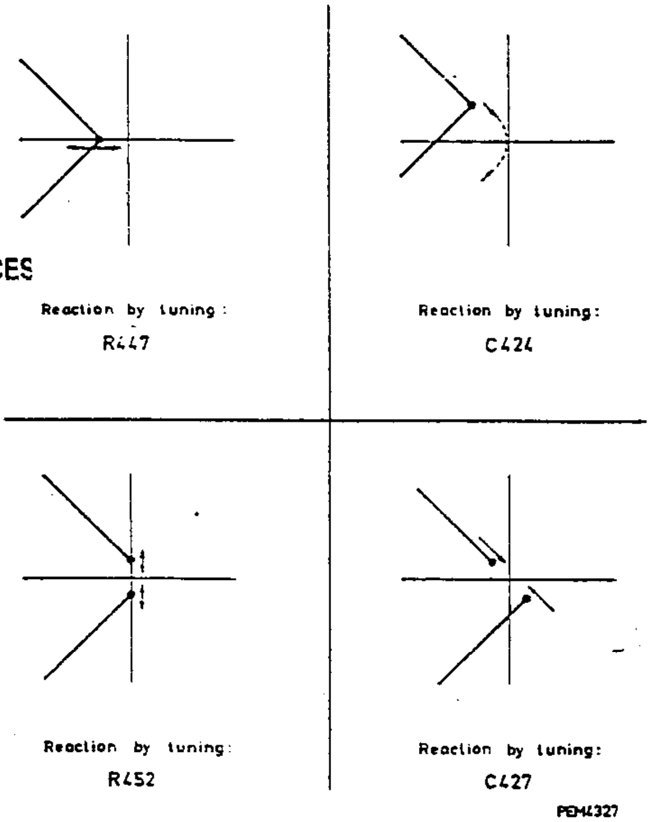


Fig. V-5. Reactions when adjusting the modulators

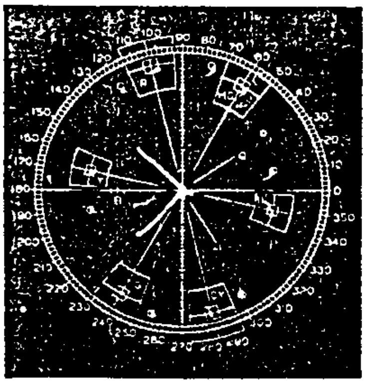


Fig. V-6. Vectorscope display showing the 'COLOUR BAR' signal

3. Adjusting the (R-Y) and (B-Y) modulator balance

Adjust the pattern generator as indicated below:

SK1	– "SOUND CARRIER"	: "OFF"
R2/SK2	– "BURST AMPL."	: "NOM." (100%)
SK3/2	– "WHITE"	: depressed

Connect the vectorscope to output "VIDEO" (BU3) terminated with 75 Ω.
Set the vectorscope to: "Internal burst controlled".
If the modulator is balanced the vectorgram should be as shown in Fig. V-4, i.e. the starting point of the burst vectors should coincide and be at the intersection of the vectorscope axes. If not, adjust R447, R452, C424 and C427 until balance is obtained.
The various possibilities when adjusting these four components are shown in Fig. V-5.

4. Adjusting the 90° phase shift of the burst signal

Use the measuring set-up mentioned in section 3.
The phase shift between the two burst signals should be 90°.
If not, adjust R437 until the correct shift is obtained.

5. Adjusting the (B-Y) amplitude of the "BAR" signal

Adjust pattern generator as mentioned in section 3, however, SK3/10 – "COLOUR BAR": depressed.
The vectorgram should be as shown in Fig. V-6.
If this is not the case, adjust R454 until the correct vectorgram is obtained.

6. Adjusting the chrominance amplifier

Use the measuring set-up mentioned in section 3.
The burst vectors should appear as two straight lines.
If not, i.e. if the vectors are curved, adjust C430 until the correct ratio is obtained.

7. Adjusting the chrominance amplification

Connect the oscilloscope (d.c. coupled) to output "VIDEO" (BU3) terminated with 75 Ω.
Alternately depress SK3/2 "WHITE" and SK3/10 "COLOUR BAR". The peak level of the chrominance signal in the first two bars should be the same as the peak level of the "WHITE" signal (see Fig. V-7).
If not, adjust R473 until equal levels are obtained.

8. Adjusting the sound subcarrier frequency

Adjust the pattern generator as indicated below:

SK1	– "SOUND CARRIER"	: "UNMOD."
SK3/1	– "BL/WH"	: depressed

During adjusting, connect terminal 26 to terminal 27.
Connect a crystal (5.5 or 6.0 MHz) between the collector of TS430 and the Y-amplifier of the oscilloscope.
The amplitude should be adjusted to maximum by means of L411.

9. Adjusting the sound frequency sweep

Adjust the pattern generator as indicated below:

SK1	– "SOUND CARRIER"	: "MOD."
SK3/1	– "BL/WH"	: depressed

During adjusting, connect terminal 26 to terminal 27.
Connect the modulation-meter to the collector of TS430.
The frequency sweep should be: ± 50 kHz ± 1 kHz.
If not adjust R499 to correct sweep.

10. Adjusting the sound subcarrier amplitude

Adjust the pattern generator as indicated below:

SK1	– "SOUND CARRIER"	: "UNMOD."
SK2/R2	– "BURST AMPL."	: "NOM." (100%)
SK3/2	– "WHITE"	: depressed
SK5	– "SYNC."	: "LINE"

Connect the oscilloscope to terminal 4.
Trigger the oscilloscope externally by means of line pulses from BU1 ("SYNC.").
The sound carrier should have the same amplitude as the video signal (as shown in Fig. V-8).
If not, adjust R4105 to the correct ratio.

11. Adjusting the modulation level

Adjust the pattern generator as indicated below:

SK1	– "SOUND CARRIER"	: "OFF"
SK2/R2	– "BURST AMPL."	: "NOM." (100%)
SK3/2	– "WHITE"	: depressed
SK5	– "SYNC."	: "LINE"
R2	– "RF OUTPUT"	: 10 mV

Connect the RF output socket (BU4) to the aerial terminals of a UHF tuner.
Connect the oscilloscope (PHILIPS PM 3330) to the IF output of the tuner.
Trigger the oscilloscope externally by means of line pulses from BU1 ("SYNC.).
Tune the pattern generator to channel 45 and the UHF tuner until maximum signal is obtained on the oscilloscope.
The residual carrier should be 15% (see Fig. V-9).
If not, adjust R488 to obtain the correct ratio.

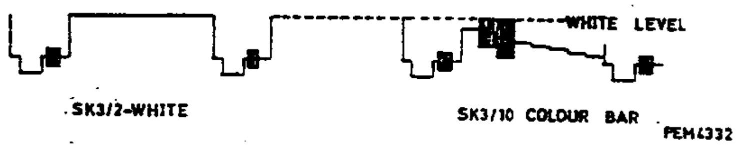


Fig. V-7. Oscilloograms for adjusting the chrominance amplifier

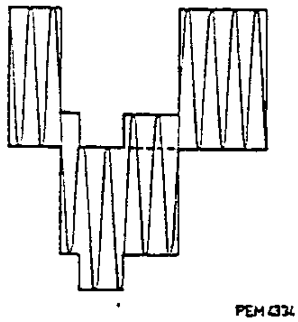


Fig. V-8. Oscillogram for adjusting the sound subcarrier amplitude

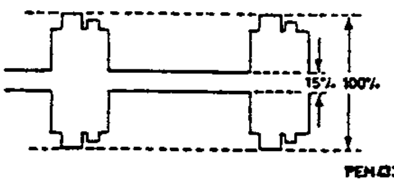


Fig. V-9. Oscillogram for adjusting the modulation level

D. PUSH-BUTTON UNIT (see Fig. V-10)

When a generator has been removed from the push-button unit, the latter must be re-adjusted to prevent backlash in the pre-adjustments.

1. Press the righthand knob on the push-button unit completely and turn the knob fully clockwise.
2. Mount the gear-wheel (5) on the generator spindle.
3. Mount the generator on the push-button unit, while pressing the gear-rack placed on slide (6) towards the knobs. The clearance between gear-wheel and gear-rack should be less than 0.3 mm.
   Press the gear-wheel forward on the spindle until it also engages gear-rack (10).
   When it has been checked that the gear-wheel is placed symmetrically with respect to gear-racks (6) and (7), mount the generator to the push-button unit.
4. Pull the spindle (13) towards the push-button side and place a spacer of 1 mm (e.g. a drill) between the stop (8) and the ring (9).
   Loosen the screws (11) and (12).
   While pressing the slide (7) towards the knobs, and the gear-rack (10) in the opposite direction, tighten the screws (11) and (12).
5. Remove the spacer between items (8) and (9).
6. When adjusting the UHF generator, turn the spindle of the generator fully clockwise. Fit the gear-wheel to the spindle by means of the two Umbraco-screws.

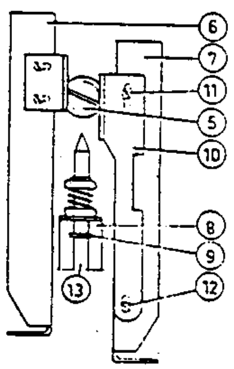


Fig. V-10. Adjusting the push-button unit

E. MODULATOR (see Fig. V-16)

Balancing of the modulator is effected by means of potentiometers R507 and R508.

The purpose of the balance adjustment, is to compensate for a certain leak in the modulator, by which part of the RF signal will by-pass the modulator, see Fig. V-12a. This part of the RF signal could be

- in phase ($\varphi = 0°$) with the modulated signal, and thus put the modulator into active unbalance (see Fig. V-12b and V-14);
- phase shifted with respect to the modulated signal ($\varphi = 90°$) and thus put the modulator into reactive unbalance (see Fig. V-12c and V-15).

Furthermore a mixture of both may occur.

Auxiliary equipment to be used:

Oscilloscope, e.g. PHILIPS PM 3230
Modulation meter, e.g. RADIOMETER AFM 1
UHF tuner (A3 687 70)
75 Ω attenuator
LF generator, e.g. PHILIPS PM 5120
A.C. millivoltmeter, e.g. PHILIPS PM 2451.

Use the measuring set-up indicated in Fig. V-11.
Disconnect the coaxial cable to the modulator at terminals 3 and 4 of unit 4.
Connect LF generator adjusted to 1 V_{p-p}/400 Hz to this cable.
Adjust modulator to active and reactive balance (see Fig. V-13), for all UHF frequencies, considering the following points of adjustment:

1. Tune to lowest UHF frequency.
2. Adjust the d.c. current in the modulator to reactive and active balance (see Fig. V-13) by means of R507 and R508 (see Fig. V-16).
3. Tune to an UHF frequency a little below the maximum frequency.
4. Check the balancing of the modulator.
5. Re-adjust, if necessary, the balancing of the modulator.
   Repeat points 2 and 5 a couple of times until proper balance is obtained.
   Then the oscillogram should be equivalent to that in Fig. V-13.
6. Check the balance at the interjacent UHF frequencies (for PM 5508: VHF frequencies as well).

Note:

In case of defective diodes (GR501 + GR502) they can easily be replaced by a selected diode pair instead of a complete modulator unit. After replacement of these diodes the adjusting procedure can be used as described above.

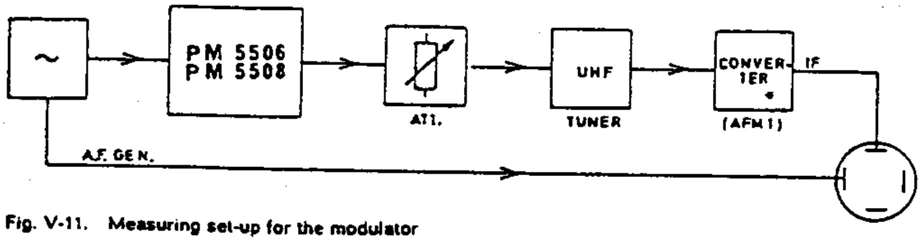


Fig. V-11. Measuring set-up for the modulator

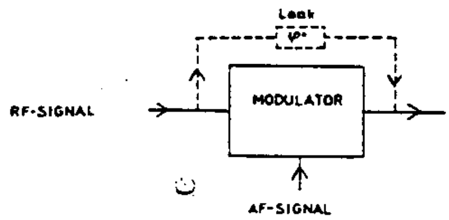


Fig. V-12a

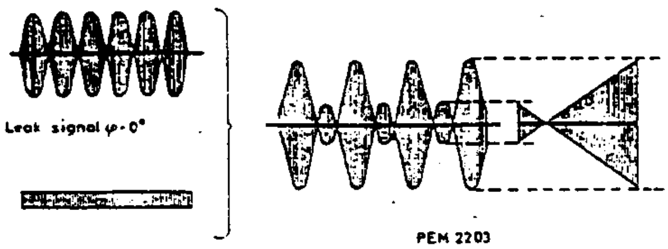


Fig. V-12b

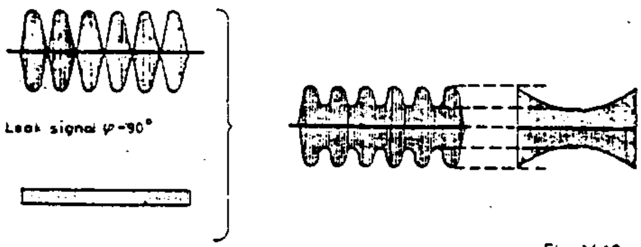


Fig. V-12c

Fig. V-12. Active and reactive unbalance

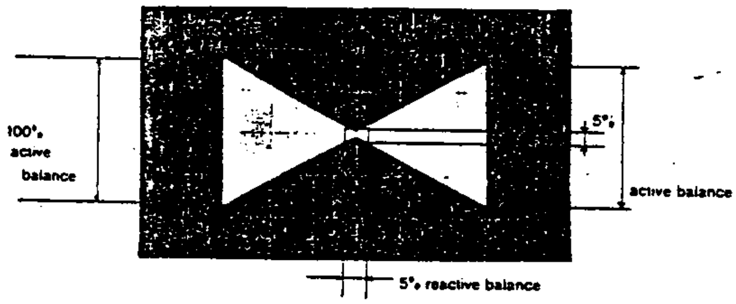


Fig. V-13. Active and reactive balance

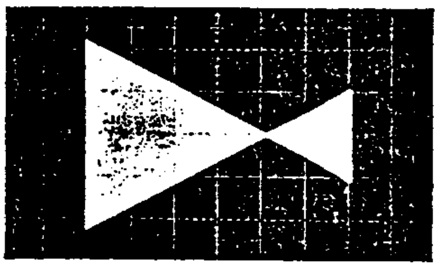


Fig. V-14. Active unbalance

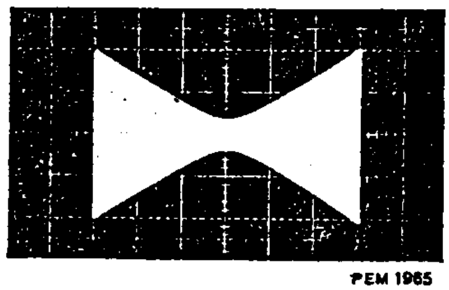


Fig. V-15. Reactive unbalance

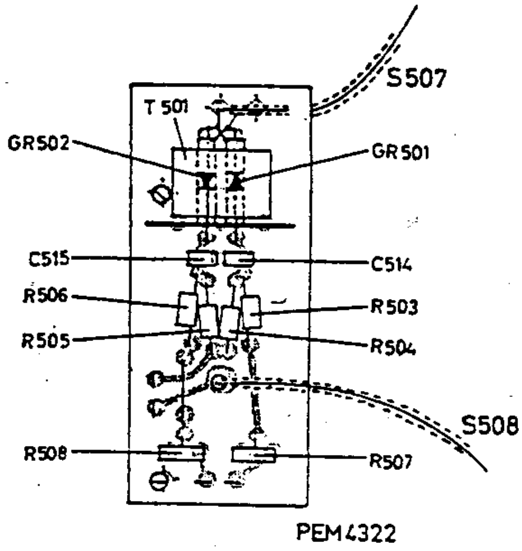


Fig. V-16. Printed wiring board, video-modulator

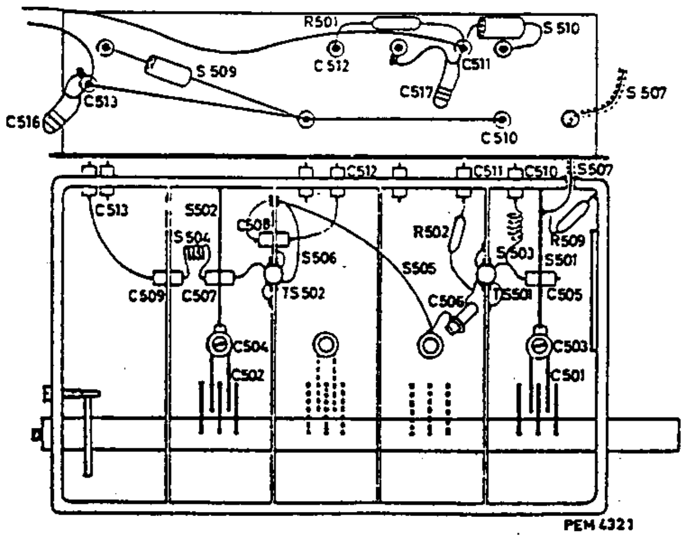


Fig. V-17. Location of parts, UHF generator

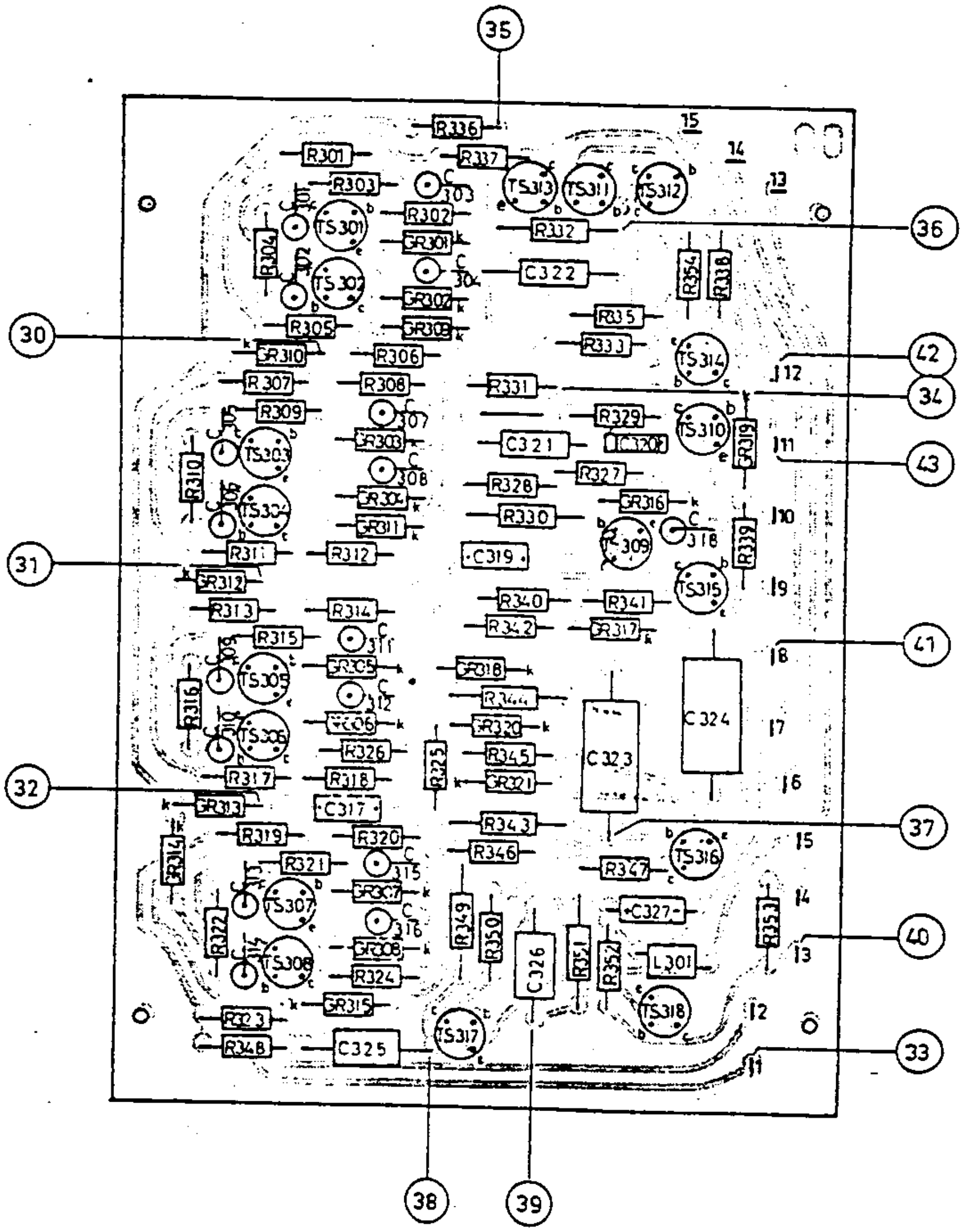


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Fig. V-18. Printed wiring board, frame information, unit 3

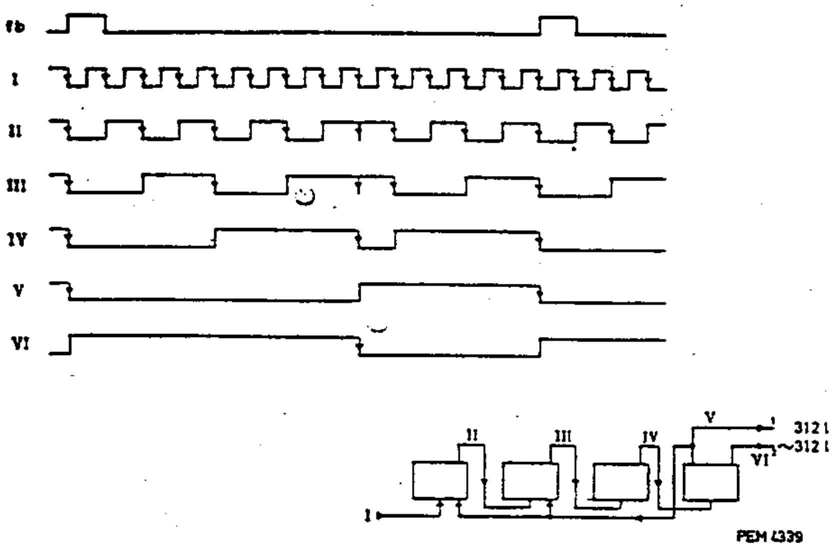


Fig. II-21. Working principle 13 : 1 divider

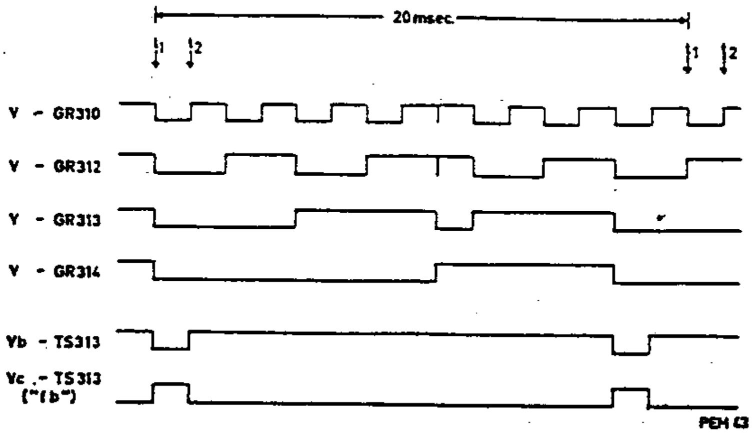
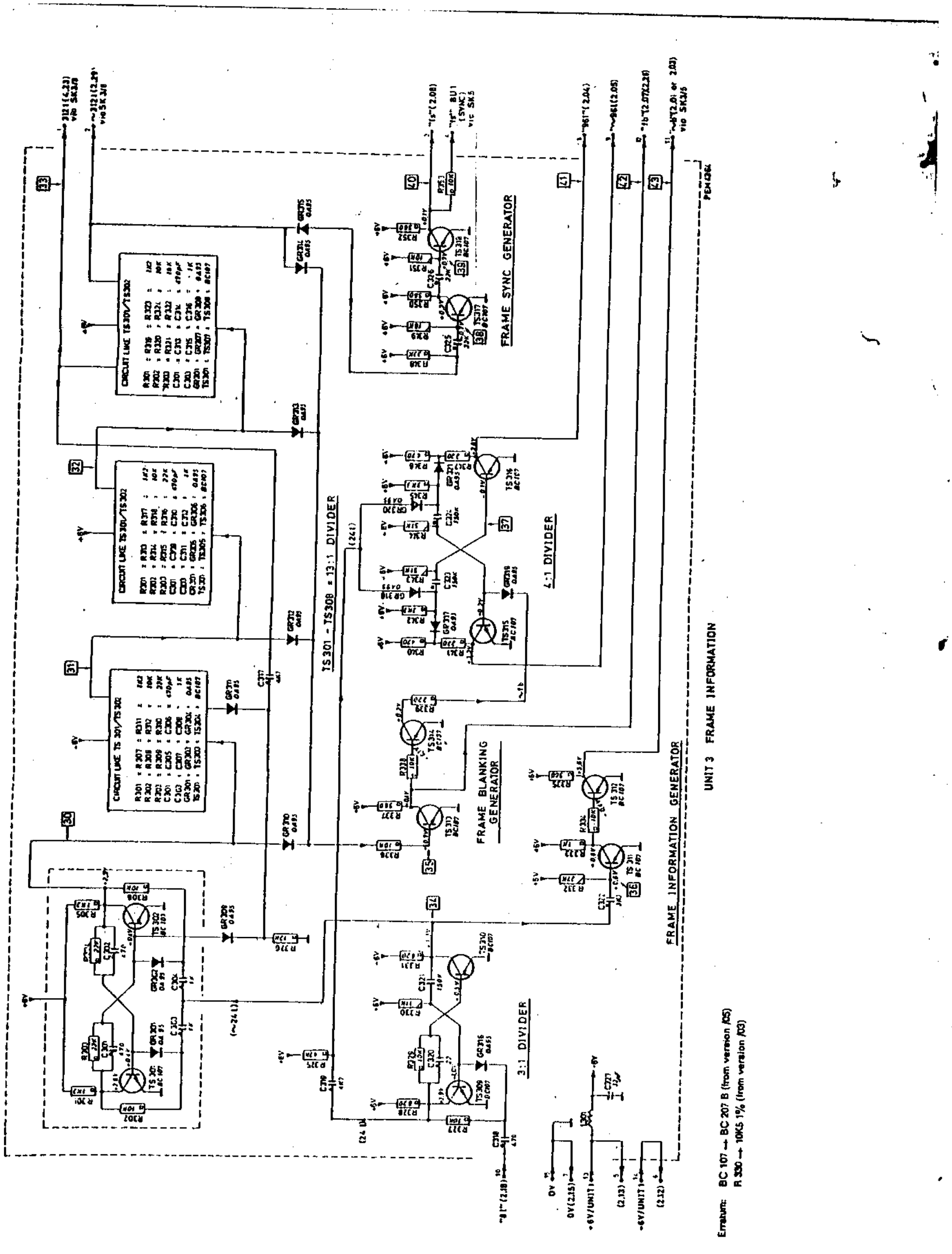


Fig. II-22. Working principle frame blanking generator


FRAME SYNC GENERATOR
TS 301 - TS308 = 13:1 DIVIDER
4:1 DIVIDER
FRAME BLANKING GENERATOR
FRAME INFORMATION GENERATOR
3:1 DIVIDER
UNIT 3 FRAME INFORMATION

3 : 1 Divider

This divider, consisting of circuit TS309/TS310 supplies drive pulses for the 13 : 1 divider, the 4 : 1 divider (TS315/TS316) and the frame information generator. The divider is a monostable multivibrator (one shot). The working principle is the same as for the 4 : 1 divider, described in unit 2b.
The dividing ratio 3 : 1 is determined bij the discharge of C321 via R330.

Frame information generator

This generator supplies the gate circuit in unit 2c with frame information pulses "~ b" used in patterns SK3/5+6: "CONVERGENCE".
The pulse is repeated every 24 lines by means of the negative-going edge of the applied "~24 l" pulse.
The width of the "~ b" pulse is 64 μs.
The generator is a pulse delay circuit consisting of C322, R232, and TS311.
The working principle is the same as that of the one shot in the frame sync. generator.
TS312 operates as an inverter/amplifier.

Frame blanking generator

The frame blanking pulse is obtained by means of AND gate GR310, GR312, GR313, GR314. The gate is controlled by pulses from the 13 : 1 divider.
The working principle is shown in Fig. II-22.
The output of the gate is "0" when all the pulses applied are 0 (time t_1-t_2).
During this time TS313 is cut off, so that its collector voltage is high (+ 6 V).
Thus the frame blanking pulse is obtained, which has a duration of 24 lines.

Frame sync. generator

This generator consists of the two pulse delay circuits C325, R349, TS317 and C326, R351, TS318.
RC circuit C235, R349 gives delay time "b" (see Fig. II-23) and C326, R351 determines the width of the sync. pulse "c".
The working principle is shown in Fig. II-23.
With no signal on the base of the transistors (moment t_1) they are in saturation. This is due to the + 6 V via R349 and R351.
At moment t_2 the negative-going edge of pulse "~312 l" will cut off TS317 and charge C325 to a negative value.
The (positive-going) pulse appearing on the collector of TS317 will have a width which is determined by the discharge time of C325 via R345 (moment t_3).
At moment t_3 the (negative-going) trailing edge of this pulse will cut off TS318.
The cut-off time, and thus the width of the "fs" pulse on the collector of TS318, depends on the discharge of C326 via R351 (moment t_4).

4 : 1 Divider

This generator supplies the gate circuit in unit 2c with the frame information pulses "~ 96 l" and "96 l" used in pattern SK3/1 - "BL/WH". The generator is an astable multivibrator consisting of TS315 and TS316.
Synchronization is effected by means of the positive-going "24 l" transients via GR318 and GR320.
Via GR319 a negative-going frame blanking pulse ensures that the divider is stopped during this period, and consequently started in the same phase after each frame blanking pulse. The working principle is shown in Fig. II-24.
At moment t_1 the oscillator is stopped by means of "~ fb" pulses which keep TS315 cut off.
At moment t_2 the positive-going transient of the "24 l" pulse via GR318 will drive TS315 into saturation. The voltage drop at the collector will charge C323 via GR315 to a negative value. This voltage keeps TS316 cut off for a period depending on the discharge time of C323 via R343.
At moment t_3 the generator is synchronized by means of the "24 l" pulses via GR320.
TS316 is now conducting, and the process is repeated, only this time TS315 is cut off.

D. COLOUR ENCODER - UNIT 4

Subcarrier oscillator - Unit 4a (see Fig. II-25)

The subcarrier is generated in crystal oscillator TS401-TS402.
The crystal is connected in series with C405, C407, C408 and C409 between the emitters of TS401 and TS402.
As the crystal has a very low impedance for the subcarrier frequency, frequency-dependent positive feedback is obtained, so that the frequency of the oscillator is determined by the crystal.
The frequency can be slightly changed by means of series capacitor C407.
Circuit L403/C411 is tuned to the subcarrier frequency and ensures a proper sinewave.
TS403/TS404 acts as low-impedance generator for the signal to the R-Y modulator, and as a buffer stage for the 90° phase shift circuit.

90° Phase shift - Unit 4a (see Fig. II-25)

The 90° phase shift of the subcarrier is obtained in circuit TS405, C413 and R415.
As shown in Fig. II-26 the voltages on emitter and collector of TS405 have a phase shift of 180°.
As the currents through R415 and C413 are the same (except for the current through TS406), it is possible, by varying the value of C413, to achieve that the voltages across R415 and C413 have the same amplitude and a phase difference between them of 90°.
As may be seen from Fig. II-26 the voltage on the base of TS406 will be shifted 90° with respect to the voltage on the base of TS405.
The circuit has the advantage that the signal amplitude will not change when adjusting the 90°.

PAL switch - Unit 4a (see Fig. II-25)

This circuit is an electronic switch.
In the stable position (no signal applied to terminal 15) TS407 is cut off, while TS408 and TS410 are saturated (+ 6 V via R419). As a result TS409 will be cut off (— 6 V via TS410).

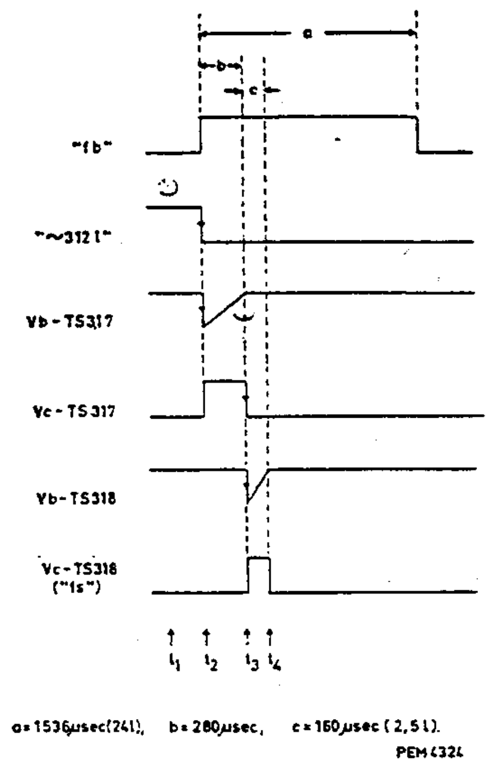


Fig. II-23. Working principle frame sync generator

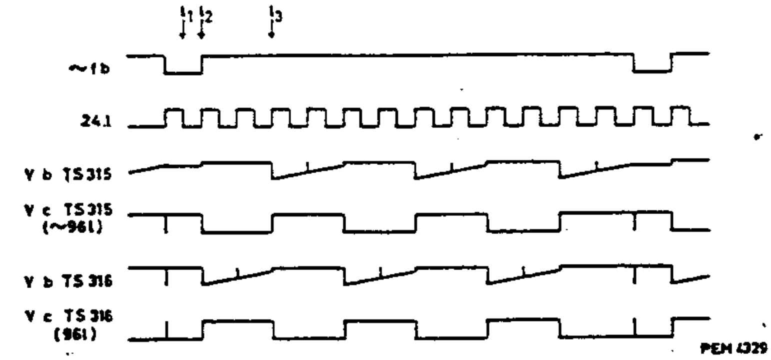
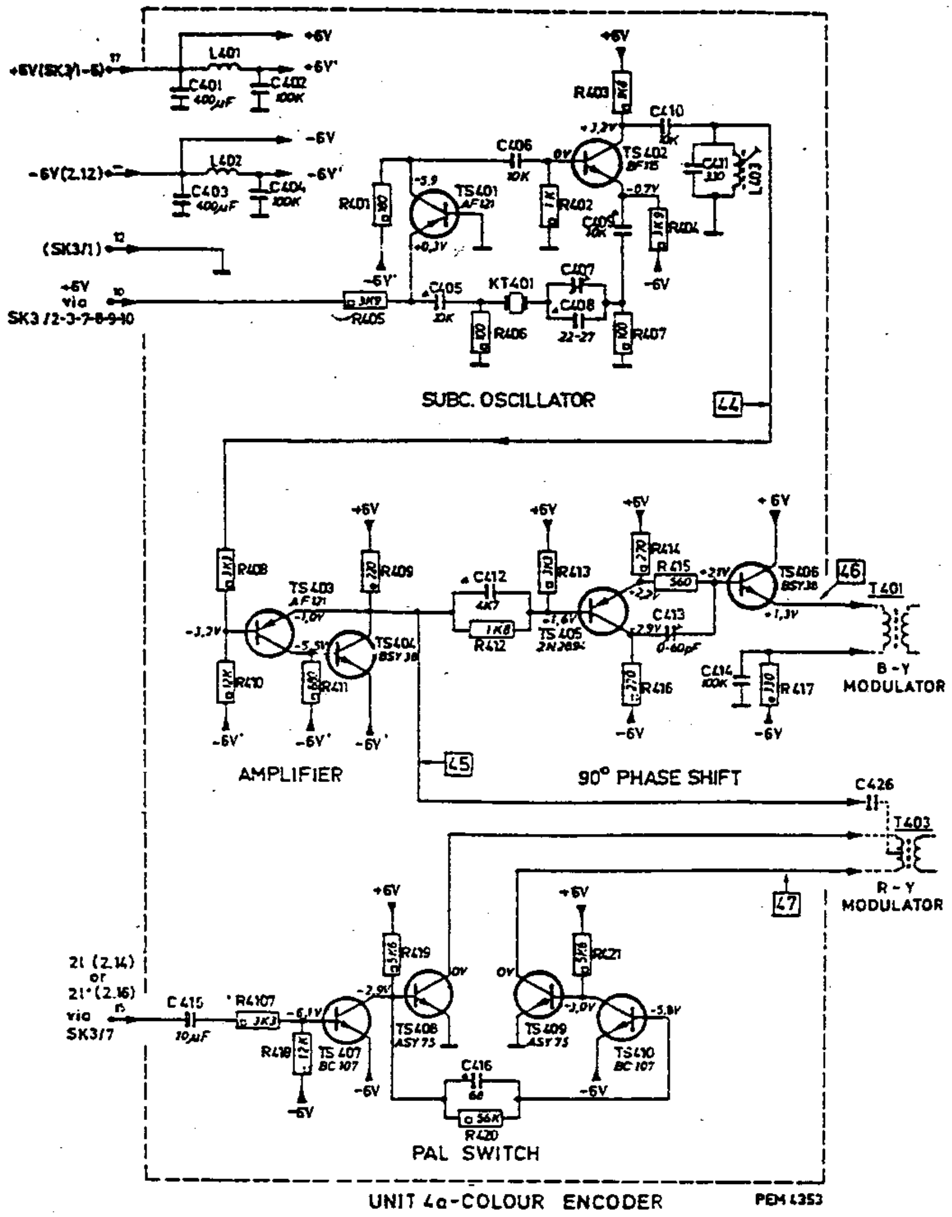


Fig. II-24. Working principle 4 : 1 divider



Erratum: BC 107 → BC 207B (from version /05)

Fig. II-25. Circuit diagram subcarrier oscillator, unit 4a

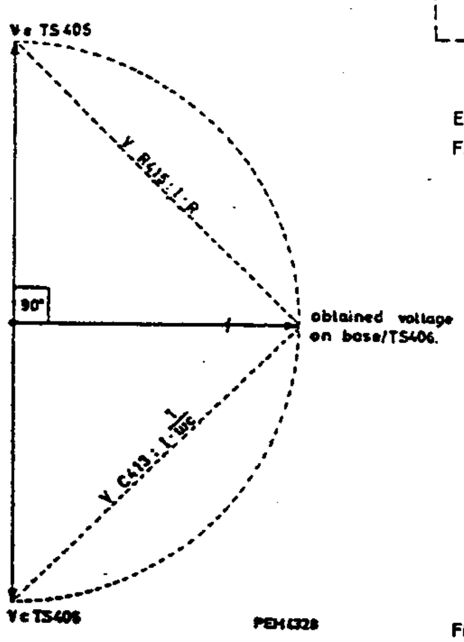


Fig. II-26. 90° phase shift

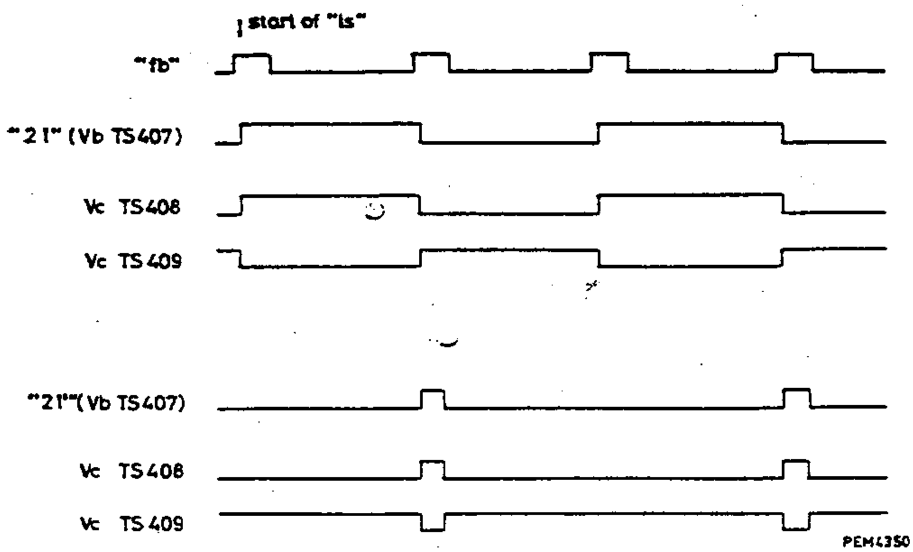


Fig. II-27. Working principle PAL-switch

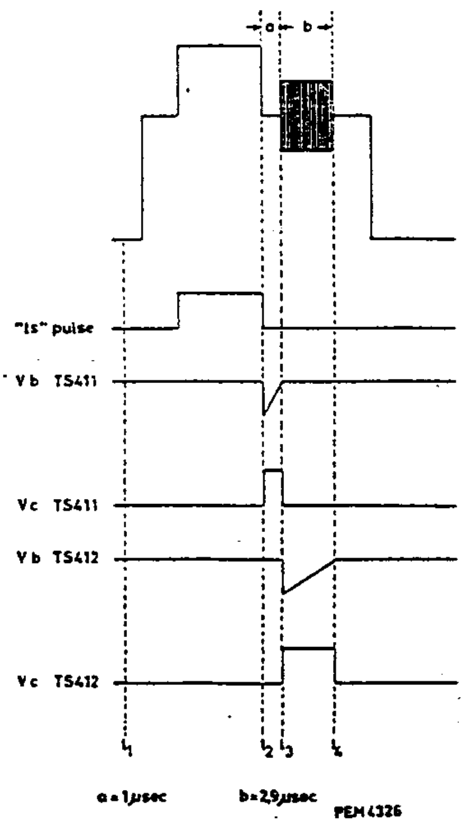


Fig. II-28. Working principle burst-key generator

This means that the 4.43 MHz signal via C426 can pass through the upper winding of TS403 only.
This position corresponds to the + (R-Y) direction.
Via SK3 "2 I" or "2 I'" pulses are applied to terminal 15. When SK3 is in one of the positions "WHITE", "RED", "PHASE", "MATRIX" or "COLOUR BAR", the R-Y phase is inverted 180° line by line means of the "2 I" pulse applied to the base of TS407.
With SK3 in position "DELAY" the R-Y phase is only shifted every second burst interval. This is effected by means of the "2 I'" pulse.
The working principle is shown in Fig. II-27.
When the base of TS407 is positive, this transistor is conducting, and TS408 will be cut off.
The negative voltage from the collector of TS407 is applied to the base of TS410 and will cut off this transistor.
The + 6 V via R421 now makes TS409 conducting. This means that the 4.43 MHz signal can pass through the lower winding of TS403 only, and this situation corresponds to the — (R-Y) direction.

Burst key generator - Unit 4b (see Fig. II-29)

This generator consists of the two pulse delay circuits C417, R423, TS411 and C418, R425, TS412.
RC circuit C417, R423 causes a delay time "a" in Fig. II-28.
C418, R425 determines the width of the burst key pulse ("b" in Fig. II-28).
The working principle is shown in Fig. II-28.
When no signals are applied to the bases of the transistors (moment t_1) they are in saturation (+ 6 V) via R423 and R425.
At moment t_2 the (negative) trailing edge of the "Is" pulse will cut off TS411 and charge C417 to a negative value (current towards the base).
The positive-going pulse on the collector of TS 411 has a width determined by the discharge time of C417 via R423.
At moment t_3 the (negative) trailing edge of the pulse from the collector of TS411 drives TS412 into cut-off. The cut-off time and thus the width of the burst key pulse at collectorTS412 depends on the discharge time of C418 via R425 (time t_4).

50/100% Saturation - Unit 4b (see Fig. II-29)

In test pattern "PHASE" the saturation during the upper part of the picture is reduced by 50%. This is obtained through TS415 and TS417 which are controlled by means of "312 I" pulses.
The transistors are cut off during the lower part of the picture and are in saturation during the upper part. During this period the signal is reduced to 50% by means of the resistors R434 and R443, which are now connected to earth.

Matrix for burst and red signal - Unit 4b (see Fig. II-29)

The burst key pulse from TS412 is matrixed in resistors R435 and R439 in order to obtain the correct burst phases (135°-225°).
The red signal (with SK3/3 depressed) is obtained by means of + 6 V applied from R429 to the matrix consisting of resistors R436 and R440.
The composite blanking signal "Ib/fb" applied to the base of TS414 ensures that no chrominance signal will occur during the blanking periodes as + 6 V from R429 is earthed via TS414.

(B-Y) and (R-Y) modulator - Unit 4B (see Fig. II-29)

This unit comprises two balanced modulators. They are supplied with the subcarrier on S1/S1' and with modulation signals on the centre tap of S2/S2' or S3/S3'.
The modulator is in balance when there is no voltage difference between the centre taps of S2/S2' and S3/S3'. A voltage of 0.2 V on contacts 22 and 25 (except in positions "DELAY", "PHASE" and "MATRIX") causes a d.c. voltage on the centre taps S3/S3'. The d.c. voltage on the centre taps of S2/S2' is adjusted to the same value with the aid of potentiometers R447 and R452.
No current flows through S2/S2' and consequently there is no output signal across S4. This is due to the fact that the subcarrier during its positive period makes diodes GR405 and GR404 conducting, and during the negative period makes GR403 and GR406 conducting.
The subcarrier across S2/S2' is thus suppressed by the diodes. The burst keying pulses are always applied to the centre tap of S3/S3'. These pulses cause an unbalance of the modulators. Then, a current flows through S3/S3' so that an output signal is obtained across S4. The amplitude of this signal is proportional to the amplitude of the burst keying pulse. During the black & white test patterns, there are also burst keying pulses on S3/S3'. However, as no subcarrier is fed to the modulators, there will be no output signal ons S4. On the other hand, the subcarrier is present at positive "WHITE" so that in that case the burst is transmitted as well.
As soon as a modulation signal is applied to S2/S2' (position "COLOUR BAR") or S3/S3' (positions "RED", "DELAY", "PHASE" and "MATRIX"), the balance of the modulators is disturbed so that an output signal is obtained across S4. The amplitude of the output signal is proportional to the amplitude of the modulation signal.
The subcarrier across S1 of the (B-Y) modulator leads the subcarrier across S1 of the (R-Y) modulator by 90°. A positive voltage applied to S3/S3' (or a negative voltage applied to S2/S2') then gives a modulation in the direction of the + (R-Y) and the — (B-Y) axis.
During the negative PAL line the subcarrier is applied to S1' of the (R-Y) modulator. This causes the phase of the (R-Y) modulator signal to be inverted, so that a positive voltage applied to S3/S3' (or a negative voltage applied to S2/S2') gives a modulation in the direction of the — (R-Y) and — (B-Y) axis.

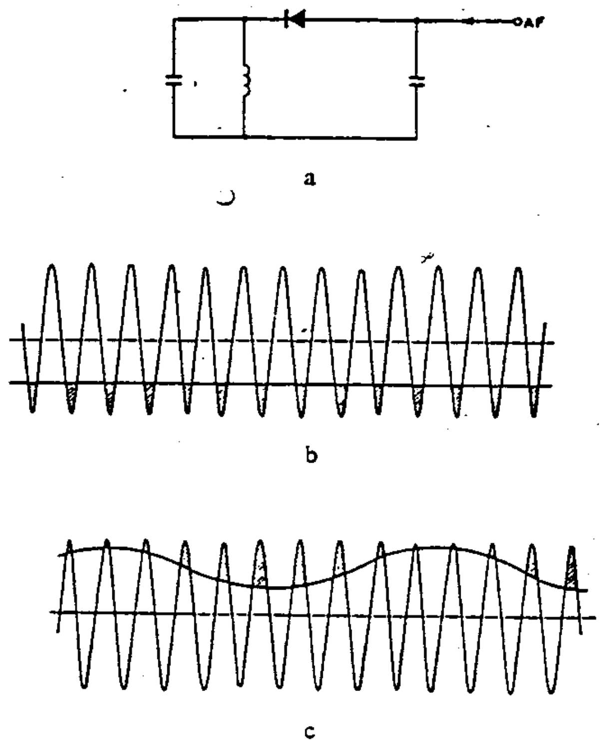


Fig. II-30. Working principle FM modulator

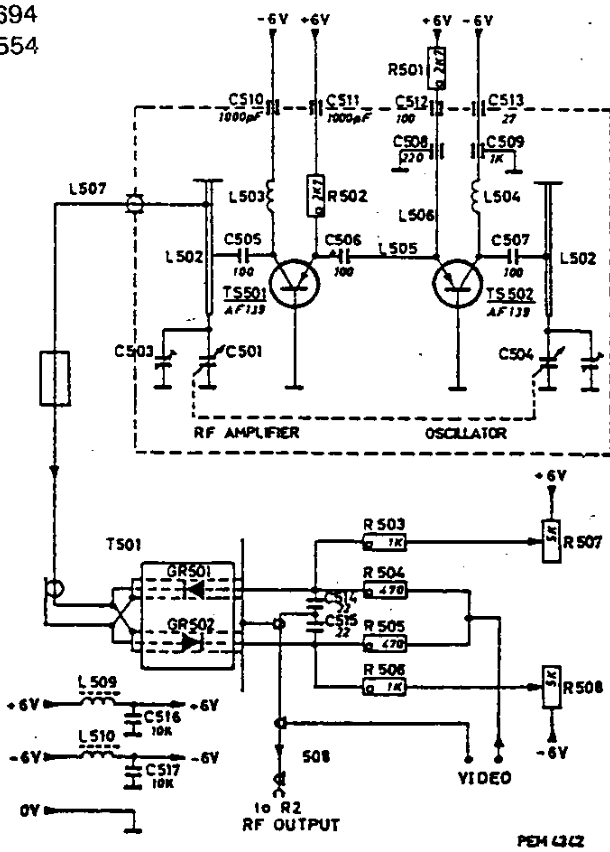
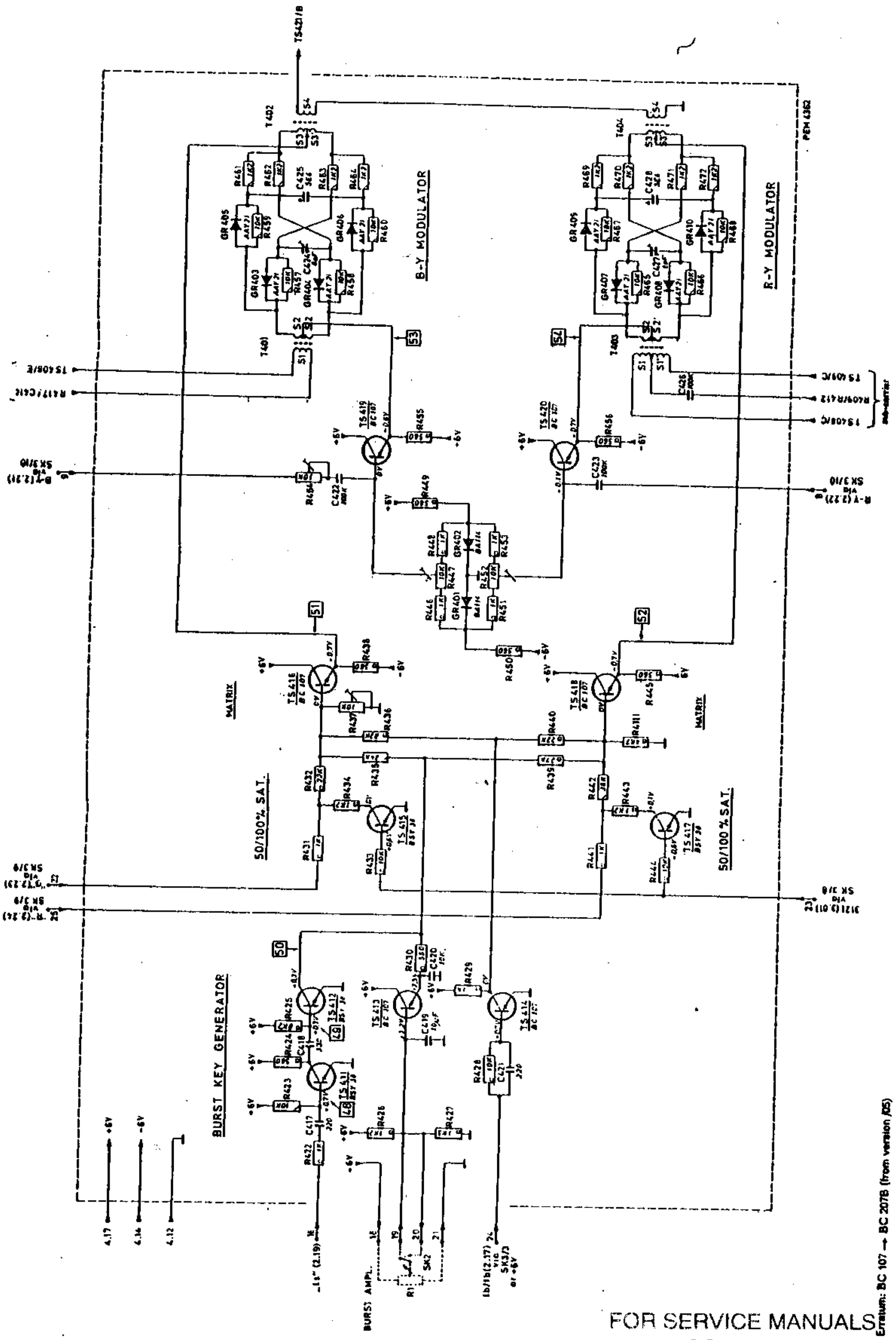


Fig. II-31a. Circuit diagram video modulator and UHF generator


B-Y MODULATOR
R-Y MODULATOR
MATRIX
MATRIX
50/100% SAT.
50/100% SAT.
BURST KEY GENERATOR
BURST AMPL.
Erratum: BC 107 → BC 207B (from version /05)

Chrominance amplifier - Unit 4c (see Fig. II-33)

TS421 is a selective amplifier tuned to 4.4 MHz, having a band-width of approx. 2 MHz, obtained by L404-C430. The band-width is determined by R475.
As the chrominance signal is obtained in the "switching circuit" of the modulators, the signal contains harmonics of 4.43 MHz. These frequencies are suppressed by means of a low-pass filter, C433-R477.
On the base of TS423 the chrominance and the luminance signals are added in correct ratio by means of R479 and R4108.

Video amplifier - Unit 4c (see Fig. II-33)

The two-stage video amplifier has a perfect phase and amplitude characteristic due to the strong negative feedback from the collector of TS424, via R481, to the emitter of TS423. The amplification is 6 dB, and the output impedance is 75 Ω.
R484, R485, L405 and C434 form an adder circuit for the video and sound signals.
The circuit is proportioned so that its impedance is 1 kΩ over the entire frequency range.

Y-signal DELAY - Unit 4c (see Fig. II-33)

The delay time obtained in the special delay cable L408 is 375 nsec.
A delay of 375 nsec covers both the delay in the generator and in the connected receiver.
Chrominance amplifier TS421 gives a delay of 200 nsec.
The remaining 175 nsec corresponds to the delay occuring in the IF part of the TV receiver.
LC circuit L407, C435, C436 and C437 ensures a proper group delay for the luminance signal.
By means of L409 correct impedance matching to the base of TS425 is obtained.
TS425 operates as an emitter follower.
The d.c. level of the video signal is determined by voltage divider R487, R488 and R489.
The d.c. level ensures that the residual carrier of the modulated signal (see Unit 5) has the correct amplitude.
The luminance signal is added to the chrominance signal via R4108.

1000 Hz oscillator - Unit 4c (see Fig. II-33)

This RC oscillator is a stabilized Wien-bridge oscillator.
The frequency is determined by R494-C440 and R496-C441.
Positive feedback is obtained via R494-C440.
The output voltage is stabilized by means of negative feedback, via C443, R492 and C439, to the base of TS426.
The feedback is dependent on the voltage across lamp LA401.
(The lamp has a high resistance when the voltage across it is high, a low resistance when the voltage across it is low.)

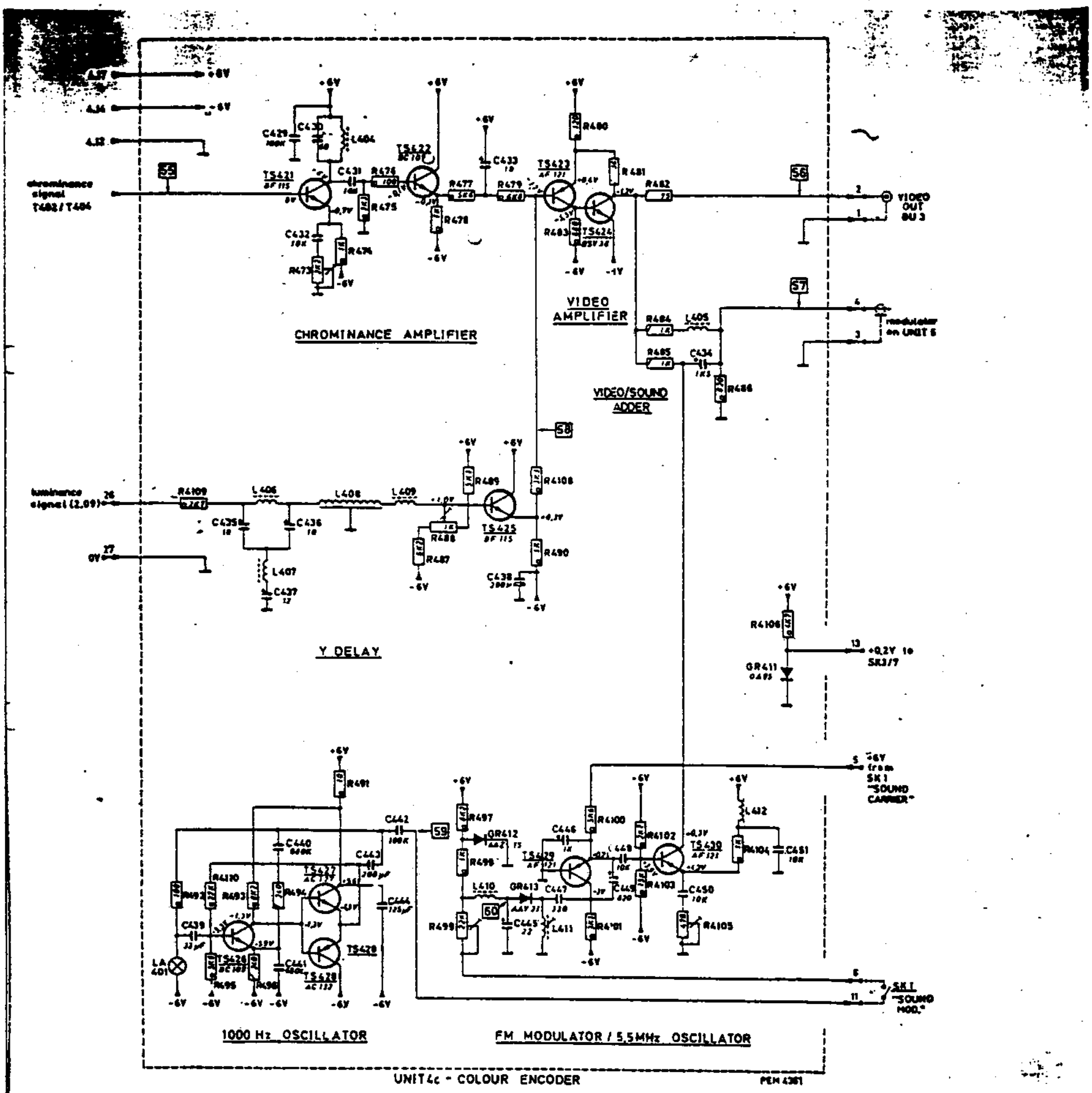
FM Modulator / 5.5 MHz (6.0 MHz) OSCILLATOR - Unit 4c (see Fig. II-33)

The 5.5 MHz oscillator is a Colpitts oscillator formed by TS429 and L411, C446, C447 and C449.
The oscillator can be switched off with SK1 "SOUND CARRIER".
When this switch is in position "OFF" the + 6 V via R4100 to the emitter of TS429 is interrupted.
FM modulation is effected according to the diode switching principle (see Fig. II-30).
Diode GR413 is conducting only during part of each period of the 5.5 MHz (or 6.0 MHz) signal.
The reactive load of the oscillator circuit will consequently depend on the conducting time of the diode.
When at the same time the diode is supplied with an AF signal (see Fig. II-30c) the reactive load of the oscillator circuit, and consequently the frequency, will change in the same rhythm as the AF signal.
The frequency deviation depends on the amplitude of the supplied AF signal, and thus on R499.
Amplifier TS430 operates as a buffer stage between the 5.5 MHz (or 6.0 MHz) oscillator and the modulator in Unit 5.
The amplification can be adjusted by varying the negative feedback by means of R4105.

E. RF CIRCUITS - UNIT 5

Modulator (see Fig. II-31)

The modulator is basically a bridge circuit (incorporating diodes) which is balanced at the carrier frequency for certain conditions of bias on the diodes.
The modulating signal is made to change the bias conditions and hence the diode impedance, so that an RF output is obtained through unbalance of the bridge.
As the modulator is balanced, it will only produce the sidebands in case of a.c. modulation, while the carrier will be suppressed (see Fig. II-32a).
If, however, a suitable d.c. voltage is added to the a.c. modulation, the RF signal will contain both carrier and side-bands (see Fig. II-32b).
When modulating with TV signals having the correct d.c. component, the RF signal will, for example, be as shown in Fig. II-32c.
The combined video and sound signal is applied to the modulator via resistors R504 and R505.
The UHF carrier is applied to the modulator via balanced transformer T501. The ferroxcube ring around the cable from the UHF oscillator to the modulator ensures balancing of the RF currents in the cable. Unbalanced currents will cause undesired radiations from that cable. The current through the diodes is adjusted by means of R507 and R508, so that the modulation is linear.
The modulated RF signal is applied to output socket "RF" via attenuator R2. Capacitors C514 and C515 serve to block d.c. components.



Erratum:

R473 → 1 kΩ
Par. to R484 → R4112 (18 kΩ)
R488 → 2,2 kΩ (from version /05)
BC107 → BC207 B (from version /05)
R498 → 680 Ω (from version B/05)

Fig. II-33. Circuit diagram chrominance amplifier, unit 4c

UHF oscillator (see Fig. II-31a)

In the UHF oscillator, due to the relatively high frequency, oscillatory circuits are used which deviate much from conventional circuits from a mechanical point of view.
The oscillator is divided into mechanical sections which in addition to their screening effect act as decimetric wave tuning circuits. Two sections are capacitively loaded coaxial conductors, the inner conductors of which are indicated as L501 and L502 in the diagram.
Each section forms a capacitively loaded conductor of about 1/20 wavelength, which by means of the capacitor is extended to an electrical length of 1/4 wavelength.
Transistor TS502 operates as an oscillator in common-base coupling. The positive feedback from collector to emitter takes place via circuits L502-L506. Choke L504 and capacitors C509 and C513 prevent radiations.
From L506 the signal is coupled via L505 and C506 to the emitter of transistor TS501.
TS501, also common-base coupled, operates as an RF amplifier.

Here choke L503 and capacitor C510 will prevent radiation. The signal is tapped from tuned collector circuit L501 and applied to the modulator. The tapping from L501 is selected so that the output impedance is 75 Ω. Variable capacitors C501 and C504, mounted on the same spindle, are used to adjust the frequency, whereas C503 and C502 are used to compensate for small padding and amplitude deviations.

F. VHF OSCILLATOR – UNIT 6 (see Fig. II-31b)

The two stage VHF oscillator has two inductive extended lecher-systems as tuning device.
The adjustable HF covers a frequency range limited by the IF carrier and channel 12. The lowest frequencies of the first four channels are gradually tunable, with limited fine-adjustment, whereas the channels of band III are continuously tunable.
Any desired frequency in band III (175.25 up to 224.25 MHz) can be preset by means of four push-buttons.
The high-quality resonance circuit in the collector of TS601 drives this stage, under the influence of the enlarged collector-emitter capacitance into oscillating.
The signal of the oscillator stage (TS601) is applied to the emitter of the buffer stage TS602 via C609. Both stages are connected in common base configuration.
The maximum frequencies, for both circuits 225 MHz, are adjusted with the trimmers C610 and C611.
The inductances L601 up to L604 and L606 up to L609 are used for adjusting the channels in band I.
The VHF-signal is taken, reflection-free, from the second lecher-system via C612 and is applied to the modulator via the T-circuit R509 up to R511.
The capacitors C613 and C614 increase the range of the IF. The remaining capacitors and inductances, which are not mentioned in particular, decouple the stages relating to the supply of the transistors, with the exception of the inductances L605 and L610, which determine the maximum frequencies with the aid of the trimmers indicated.

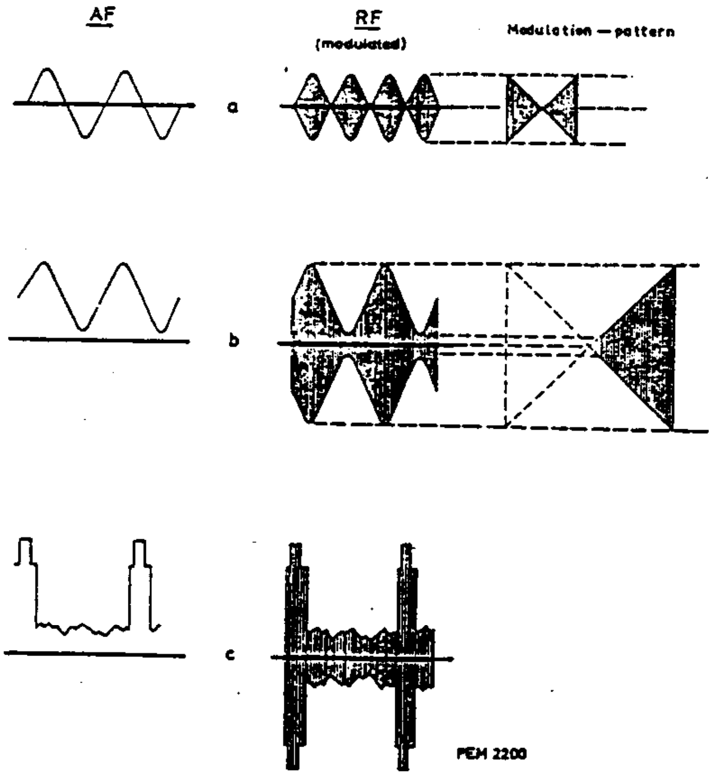


Fig. II-32. Oscillograms for the description on the video modulator

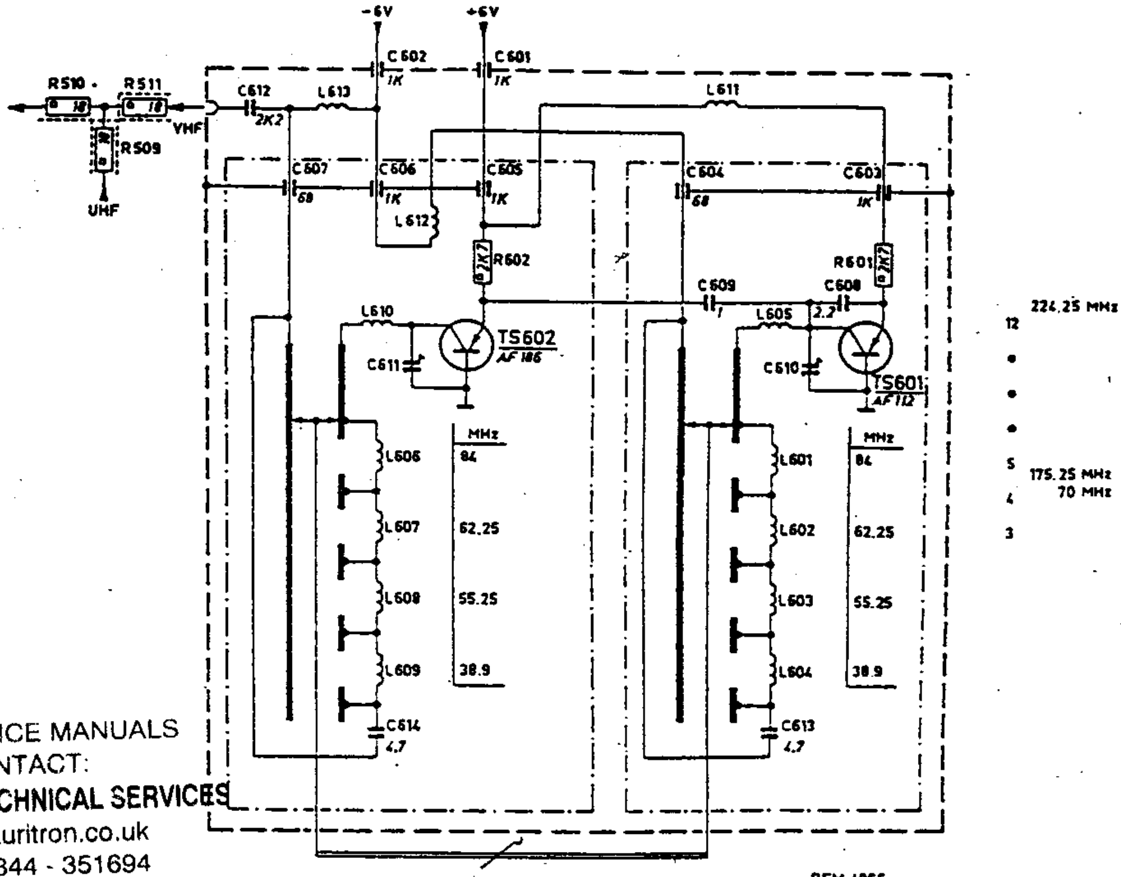


Fig. II-31b. Circuit diagram VHF-generator

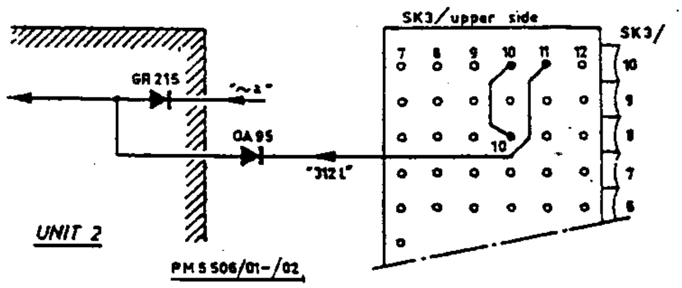


FIG.1

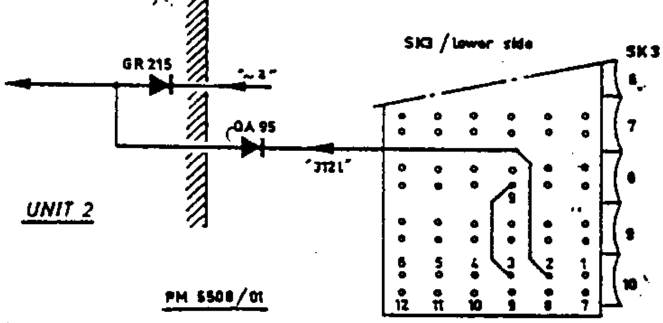


FIG.2

PEM4760

Fig. II-34. Wiring plan modified "COLOUR BAR" pattern

G. MODIFIED "COLOUR BAR" PATTERN

In some types of colour television receivers normal cathode resistors have been used for the CRT instead of VDR resistors.

As opposed to VDR resistors, normal resistors will cause negative feedback of the colour difference signals to the Wehnelt cylinders. On account of this the amplitude of these signals should be adapted to the degree of feedback. For servicing these types of receivers, the "COLOUR-BAR" pattern of the PM 5508/01S and -/02 has been changed into a pattern consisting of (the same) colour-bars with a white lower-section.

The white lower-section which has the same video amplitude as the white bar in the top part, serves as a reference so that the amplitude ratio of the colour difference signals can be adjusted while using the picture screen as an indicator.

During manufacturing of the PM 5508/01, approx. 150 instruments have already been modified as described below; these instruments have been called PM 5508/01S. The entire series PM 5508/02 will also contain this modification, while both series PM 5506/01 and PM 5506/02 were already finished before this modification could be introduced.

The instruments PM 5506/01, PM 5506/02 and PM 5508/01 can still be modified in accordance with the following prescription.

1. PM 5506/01 AND PM 5506/02 (see Fig. II-34-1)

At SK3/upper side:

- Interconnect tags SK3/8.10 and SK3/10.10
- Connect tag SK3/10.11 via a supplementary diode OA95 (cathode to SK3/10.11) to the anode of GR215 in unit 2.

2. PM 5508/01 (see Fig. II-34-2)

At SK3/lower side:

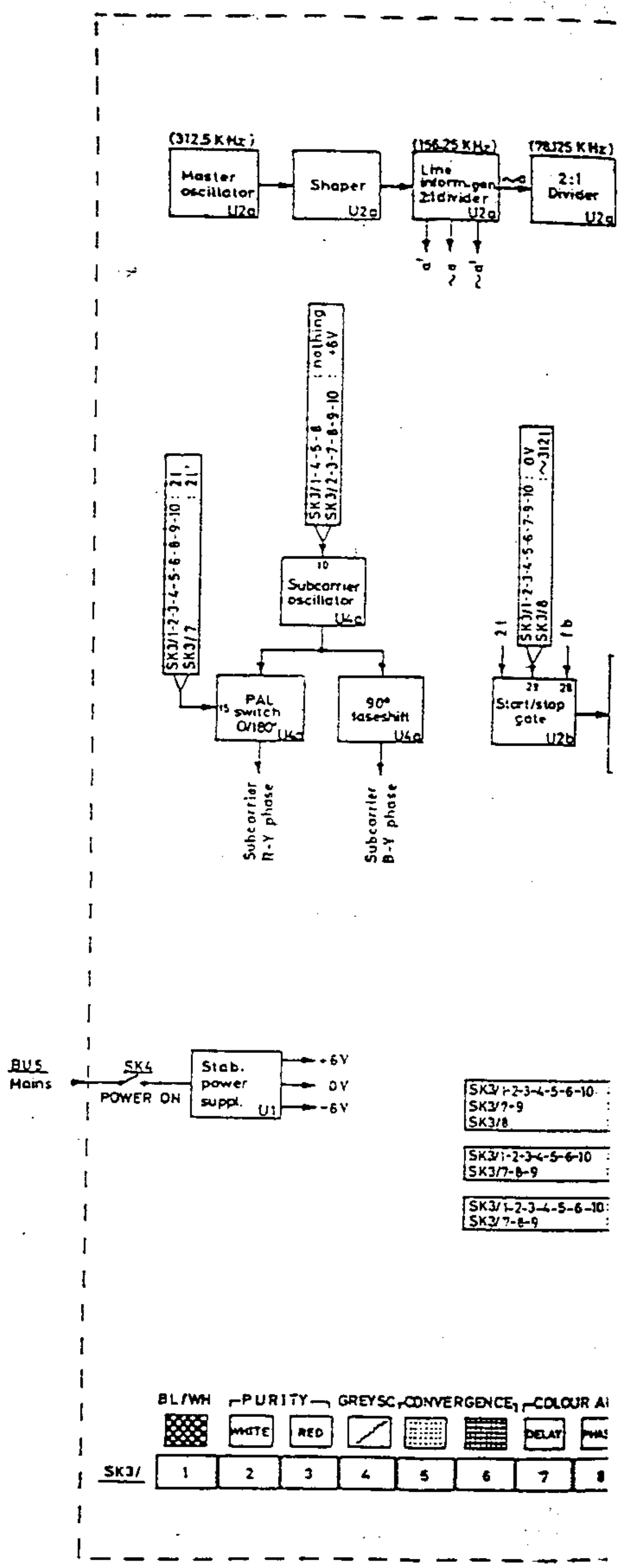
- Interconnect tags SK3/8.09 and SK3/10.03.
- Connect tag SK3/10.02 via a supplementary diode OA95 (cathode to SK3/10.02) to the anode of GR215 in unit 2.

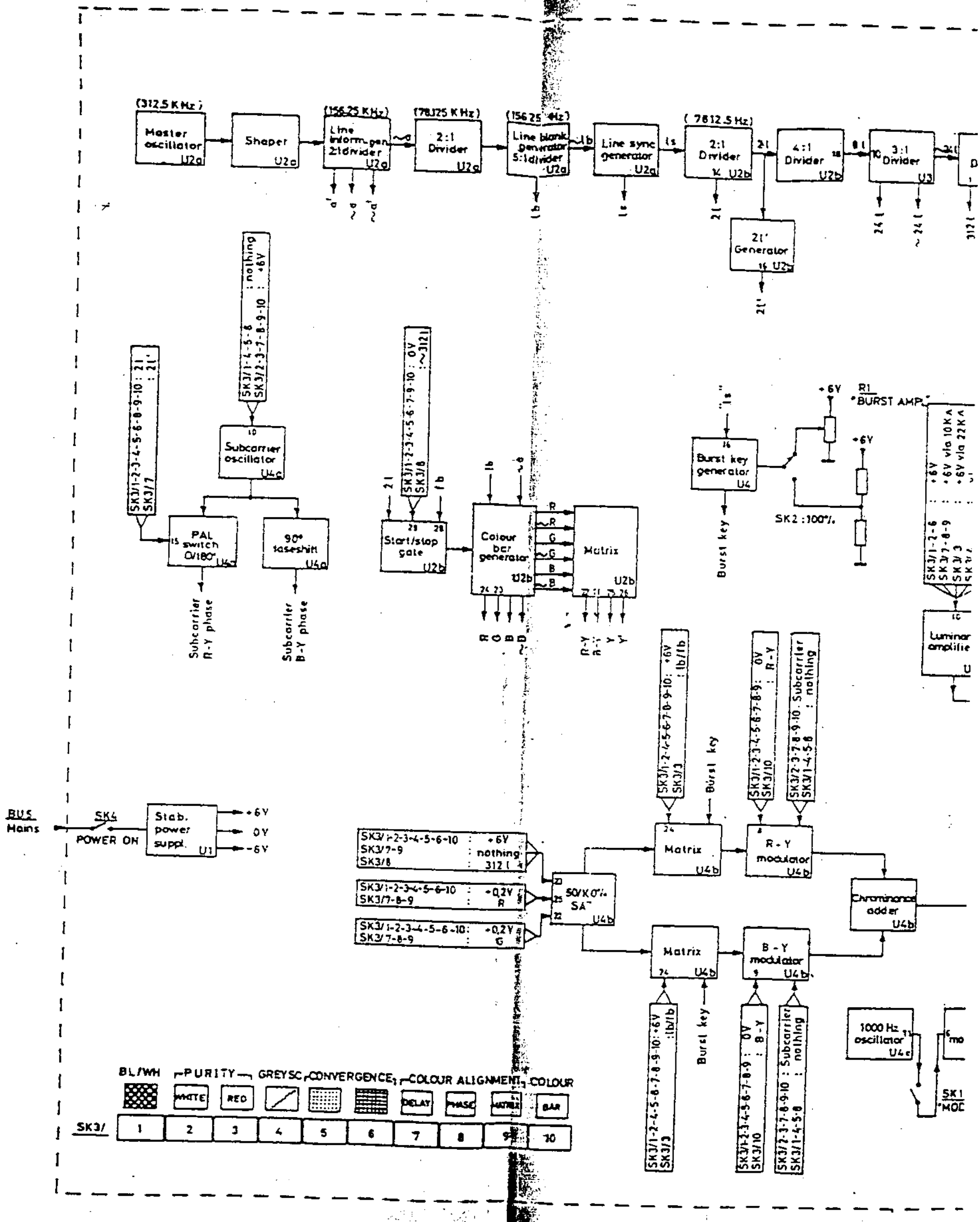
3. EXPLANATION

Via a blank switch segment of SK3/10 ("COLOUR BAR") the "312 l"-pulses from terminal 1 of unit 3 are supplied to an and-gate consisting of the added diode OA95 and GR215 in unit 2.

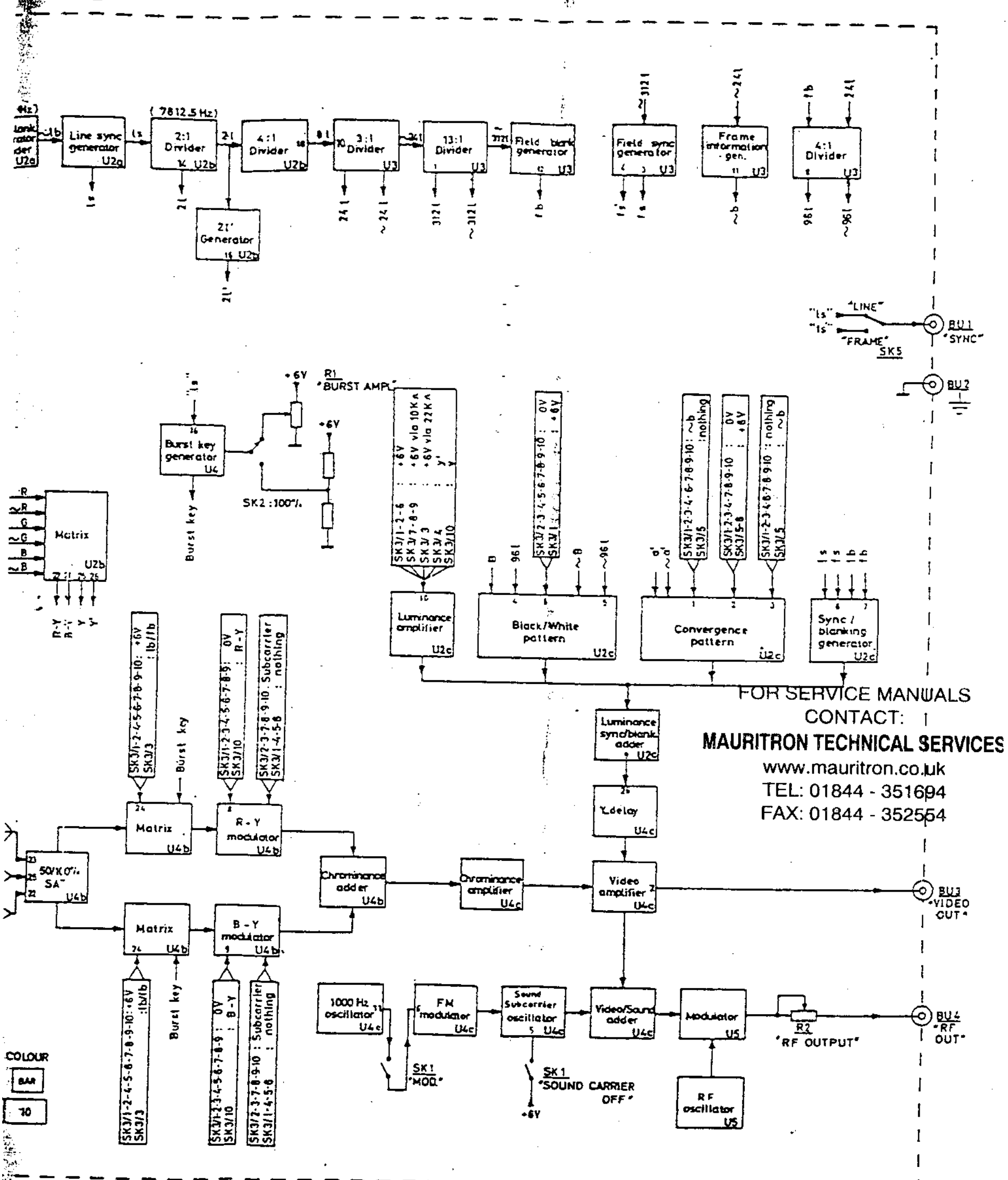
If SK3/10, "COLOUR BAR" is depressed, the "312 l"-pulses will cut off the added diode OA95 during the first 192 lines of the TV-field.

In this condition the control signal "~a" will operate the colour-bar generator via GR215. During the remaining 120 lines of the field, the added diode OA95 will be made conductive by the "312 l"-pulses. As a result the colour bar generator will be inoperative and the lower part of the pattern becomes only white.


(312.5 KHz)
Master oscillator U2a
Shaper U2a
(156.25 KHz)
Line inform. gen. 2:1 divider U2a
(78.125 KHz)
2:1 Divider U2a
SK3/1-4-5-8 : nothing
SK3/2-3-7-8-9-10 : +6V
Subcarrier oscillator U4a
SK3/1-2-3-4-5-6-8-9-10 : 21
SK3/7 : 21'
PAL switch 0/180° U4
90° faseshift U4a
Subcarrier R-Y phase
Subcarrier B-Y phase
SK3/1-2-3-4-5-6-7-9-10 : 0V
SK3/8 : ~312
Start/stop gate U2b
BUS
Mains
SK4
POWER ON
Stab. power suppl. U1
+6V
0V
-6V
SK3/1-2-3-4-5-6-10
SK3/7-9
SK3/8
SK3/1-2-3-4-5-6-10
SK3/7-8-9
SK3/1-2-3-4-5-6-10
SK3/7-8-9
BL/WH
PURITY
WHITE
RED
GREYSC
CONVERGENCE
COLOUR
DELAY
SK3/
1
2
3
4
5
6
7
8



(312.5 KHz)
Master oscillator U2a
Shaper U2a
(156.25 KHz)
Line inform. gen. 2:1 divider U2a
(78125 KHz)
2:1 Divider U2a
(15625 Hz)
Line blank generator 5:1 divider U2a
Line sync generator U2a
(7812.5 Hz)
2:1 Divider U2b
4:1 Divider U2b
3:1 Divider U3
2l' Generator U2b
Subcarrier oscillator U4c
PAL switch 0/180° U4c
90° faseshift U4a
Subcarrier R-Y phase
Subcarrier B-Y phase
SK3/1-2-3-4-5-6-8-9-10 : 2l
SK3/7 : 2l'
SK3/1-4-5-8 : nothing
SK3/2-3-7-8-9-10 : +6V
SK3/1-2-3-4-5-6-7-9-10 : 0V
SK3/8 : ~312l
Start/stop gate U2b
Colour bar generator U2b
Matrix U2b
Burst key generator U4
Burst key
R1 "BURST AMP."
SK2 : 100%
Luminance amplifier
BUS Mains
SK4 POWER ON
Stab. power suppl. U1
+6V
0V
-6V
SK3/1-2-3-4-5-6-10 : +6V
SK3/7-9 : nothing
SK3/8 : 312 l
SK3/1-2-3-4-5-6-10 : +0,2V
SK3/7-8-9 : R
SK3/1-2-3-4-5-6-10 : +0,2V
SK3/7-8-9 : G
50/KO% SA U4b
Matrix U4b
R-Y modulator U4b
B-Y modulator U4b
Chrominance adder U4b
SK3/1-2-4-5-6-7-8-9-10 : +6V
SK3/3 : lb/lb
SK3/1-2-3-4-5-6-7-8-9 : 0V
SK3/10 : R-Y
SK3/2-3-7-8-9-10 : Subcarrier
SK3/1-4-5-6 : nothing
SK3/10 : B-Y
1000 Hz oscillator U4c
SK1 "MOD
BL/WH
PURITY
WHITE
RED
GREYSC
CONVERGENCE
COLOUR ALIGNMENT
DELAY
PHASE
MATRIX
COLOUR
BAR
SK3/
1
2
3
4
5
6
7
8
9
10



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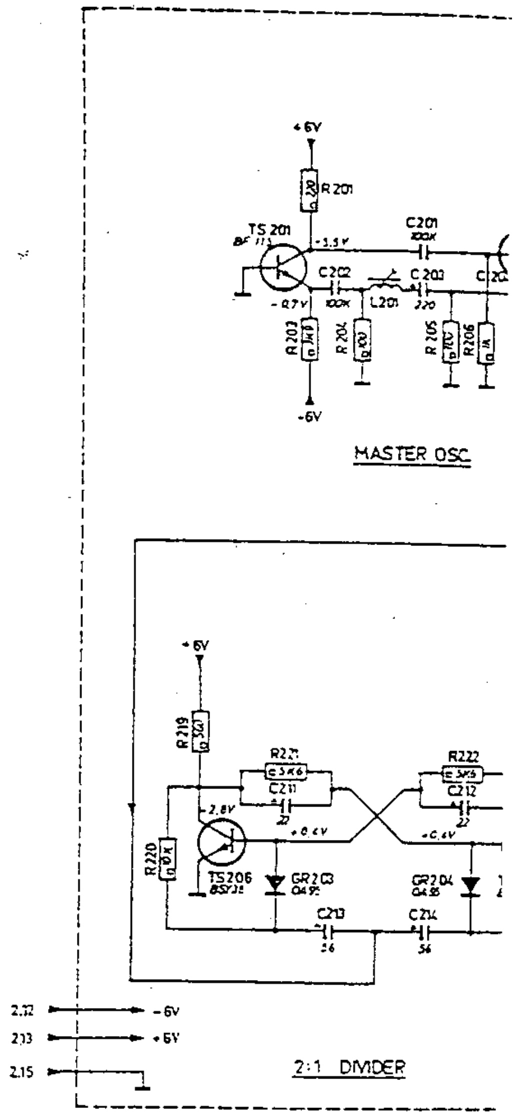
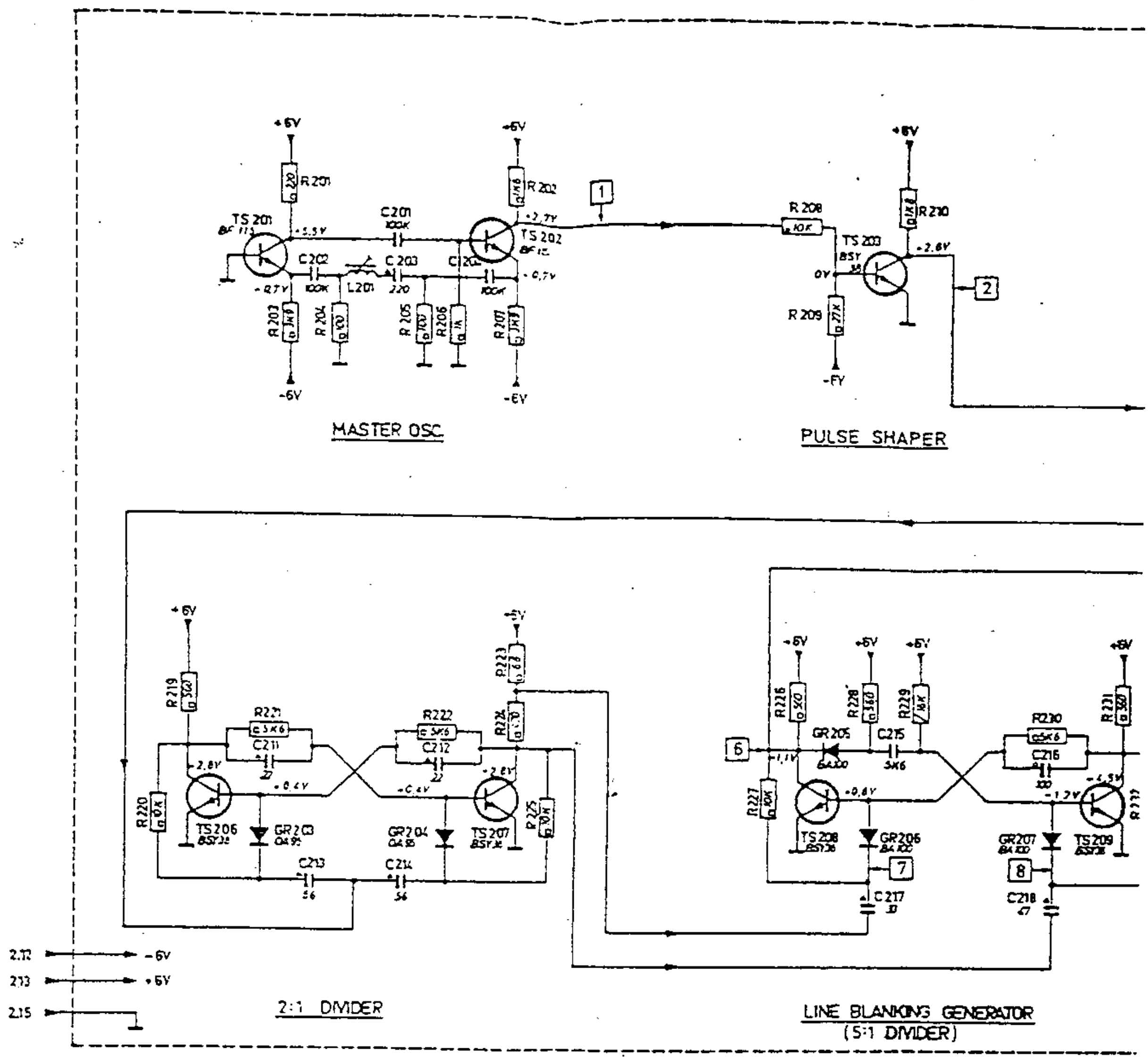
MAURITRON TECHNICAL SERVICES
www.mauritron.co.uk
TEL: 01844 - 351694
FAX: 01844 - 352554

PEM 4025

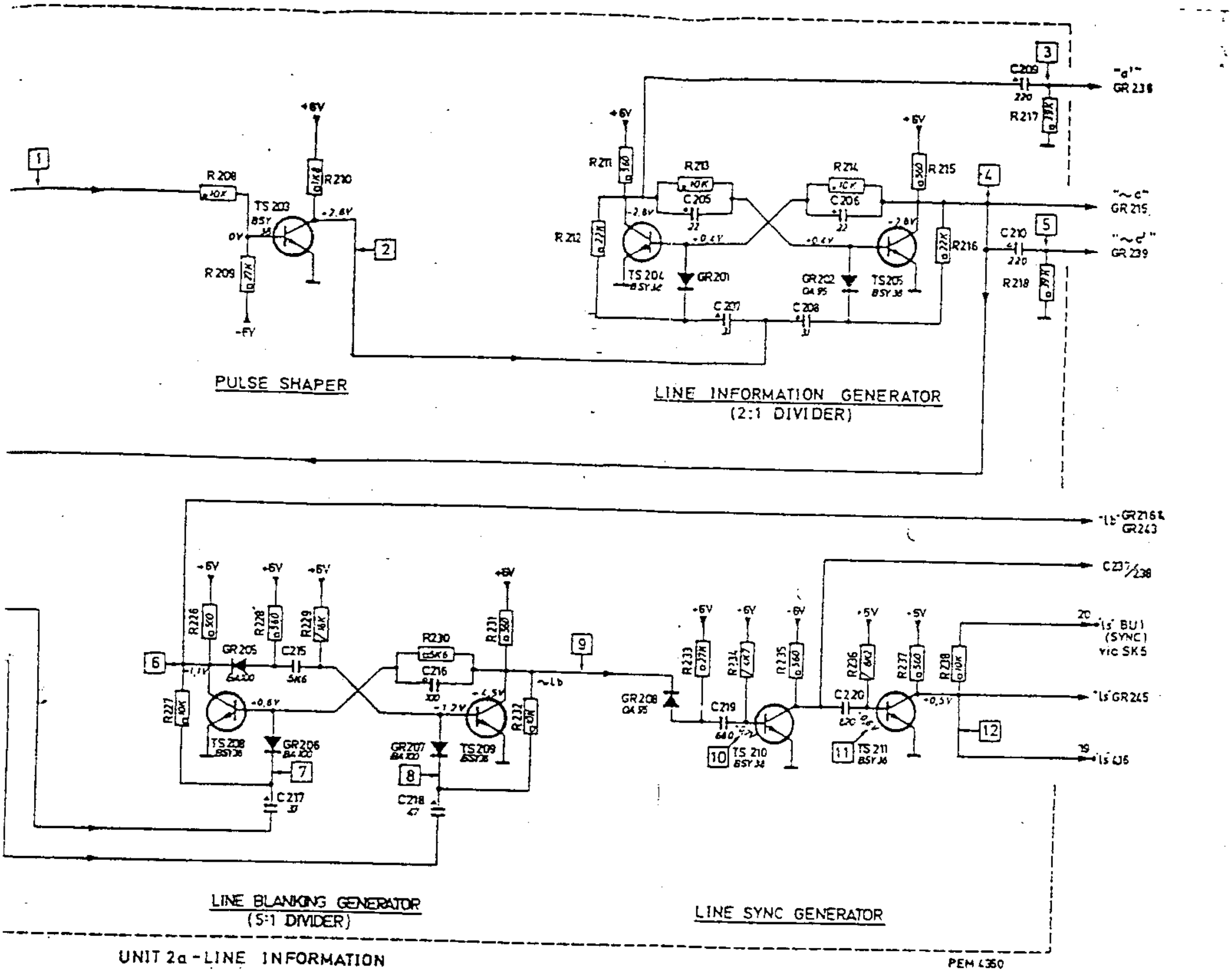


Erratum: R223 39-56 Ω 5% (from version/03)
R229 10-12 kΩ 5%
C215 8.2 nF 5%



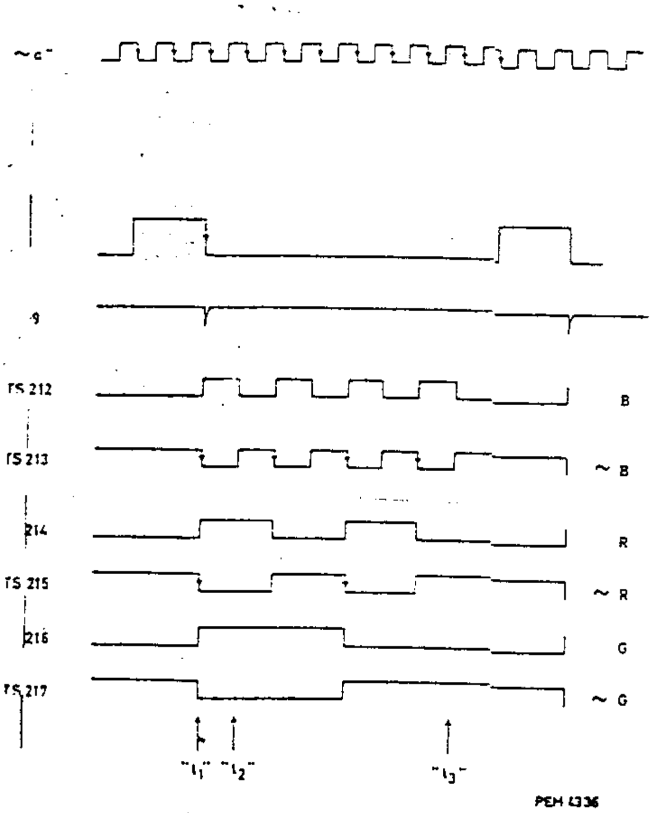
UNIT 2a - LINE INFORMATION

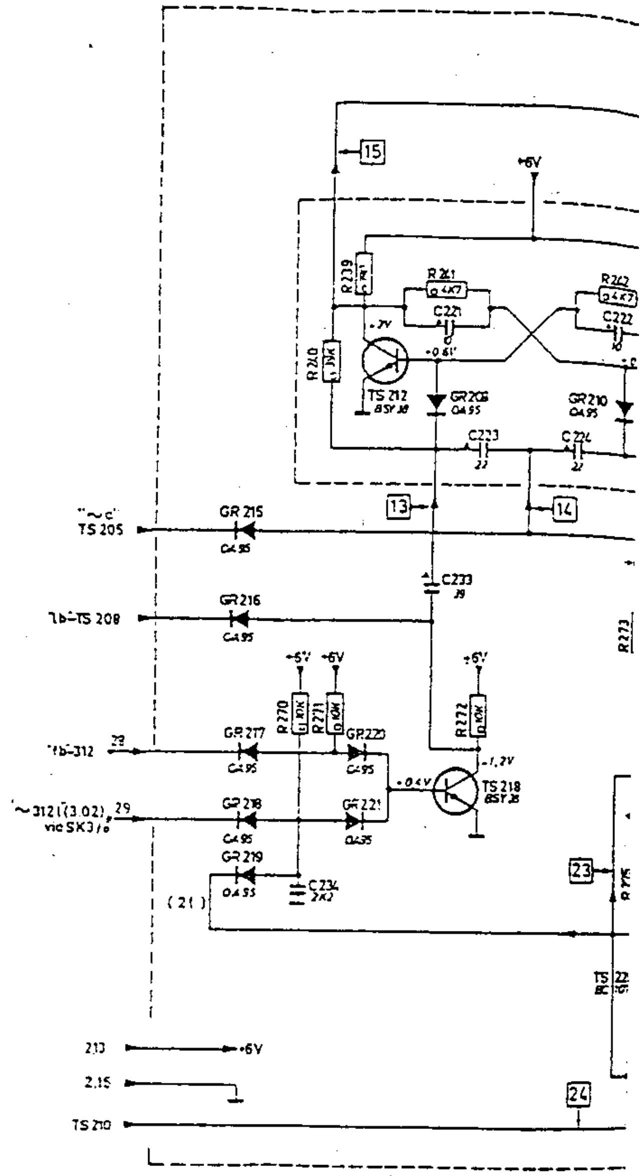
Erratum: R223 39-56 Ω 5% (from version/03)
R229 10-12 kΩ 5%
C215 8.2 nF 5%



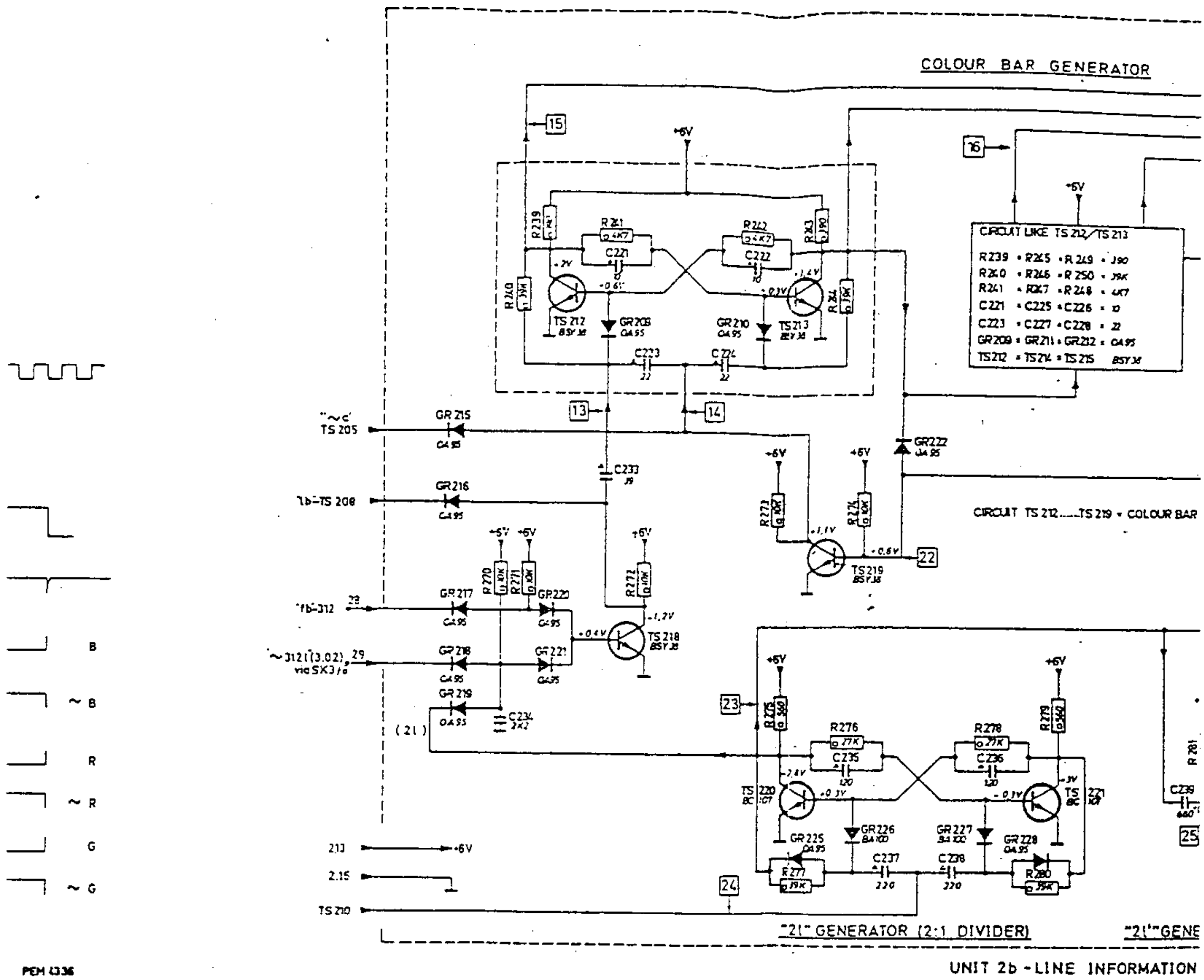
UNIT 2a - LINE INFORMATION

PEH 4360



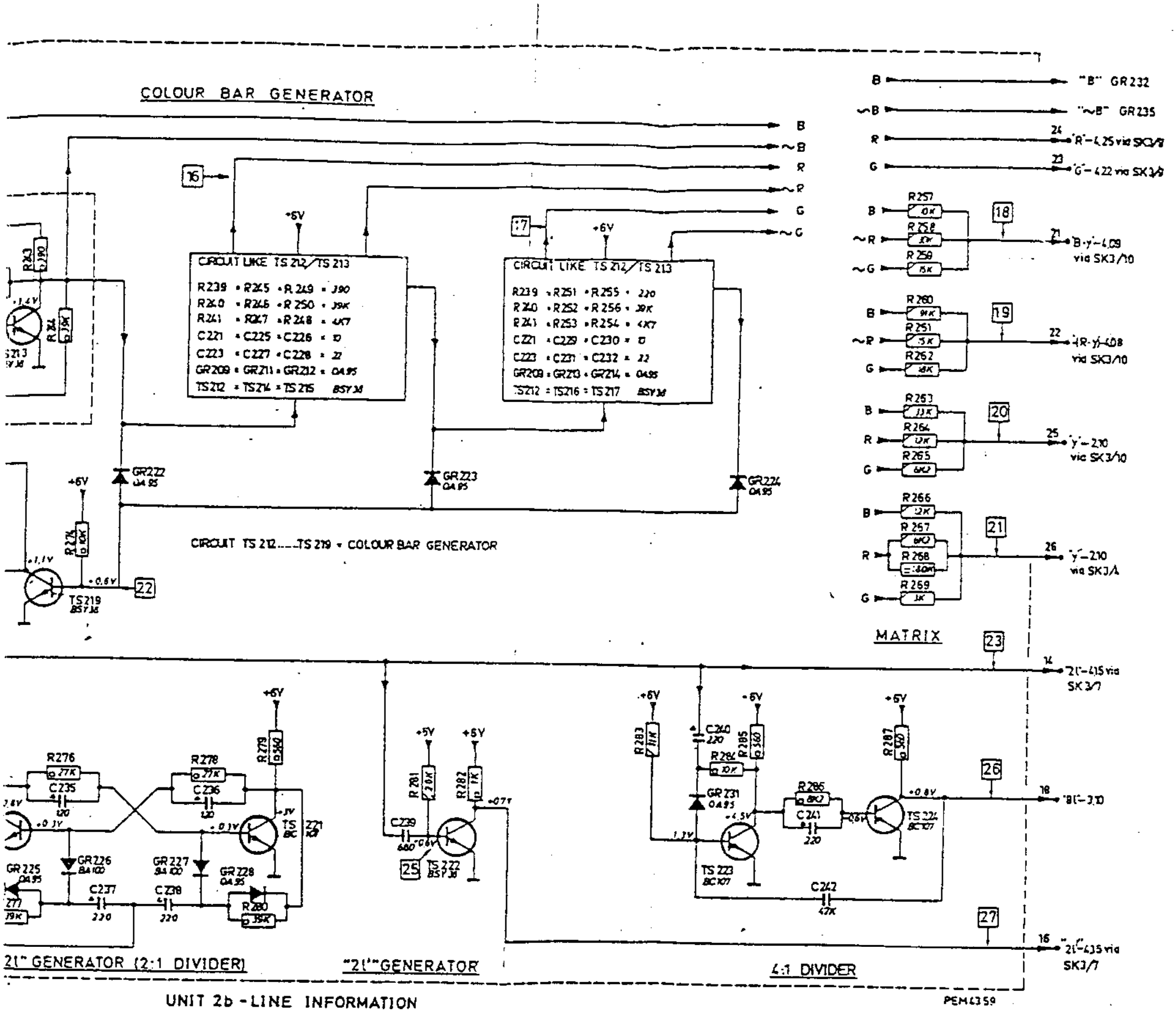


Erratum: BC 107 → BC 207 B (from version /05)



UNIT 2b - LINE INFORMATION

Erratum: BC 107 → BC 207 B (from version /05)


COLOUR BAR GENERATOR
CIRCUIT LIKE TS 212/TS 213
CIRCUIT TS 212.....TS 219 = COLOUR BAR GENERATOR
MATRIX
21" GENERATOR (2:1 DIVIDER)
"21'" GENERATOR
4:1 DIVIDER
UNIT 2b - LINE INFORMATION
PEM4359

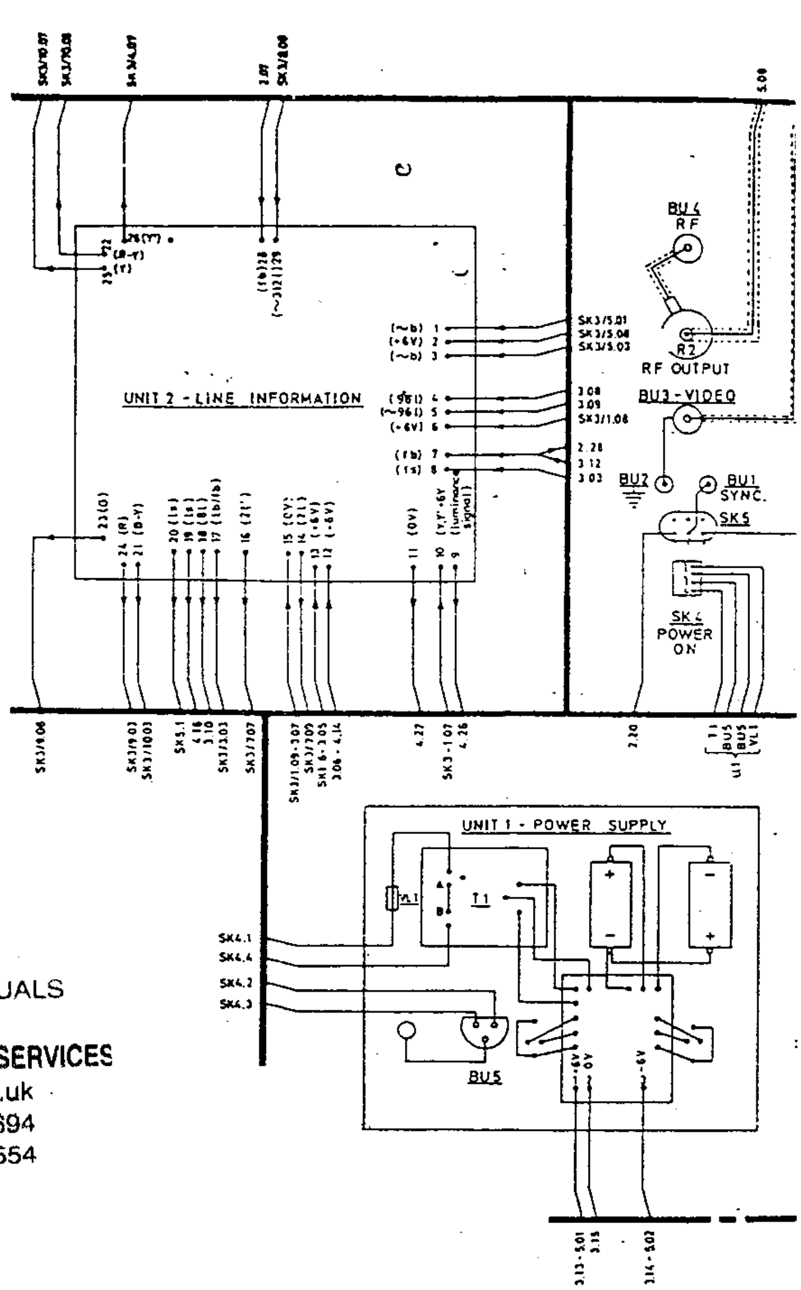


Fig. V-19a. General wiring plan (PM 5506)

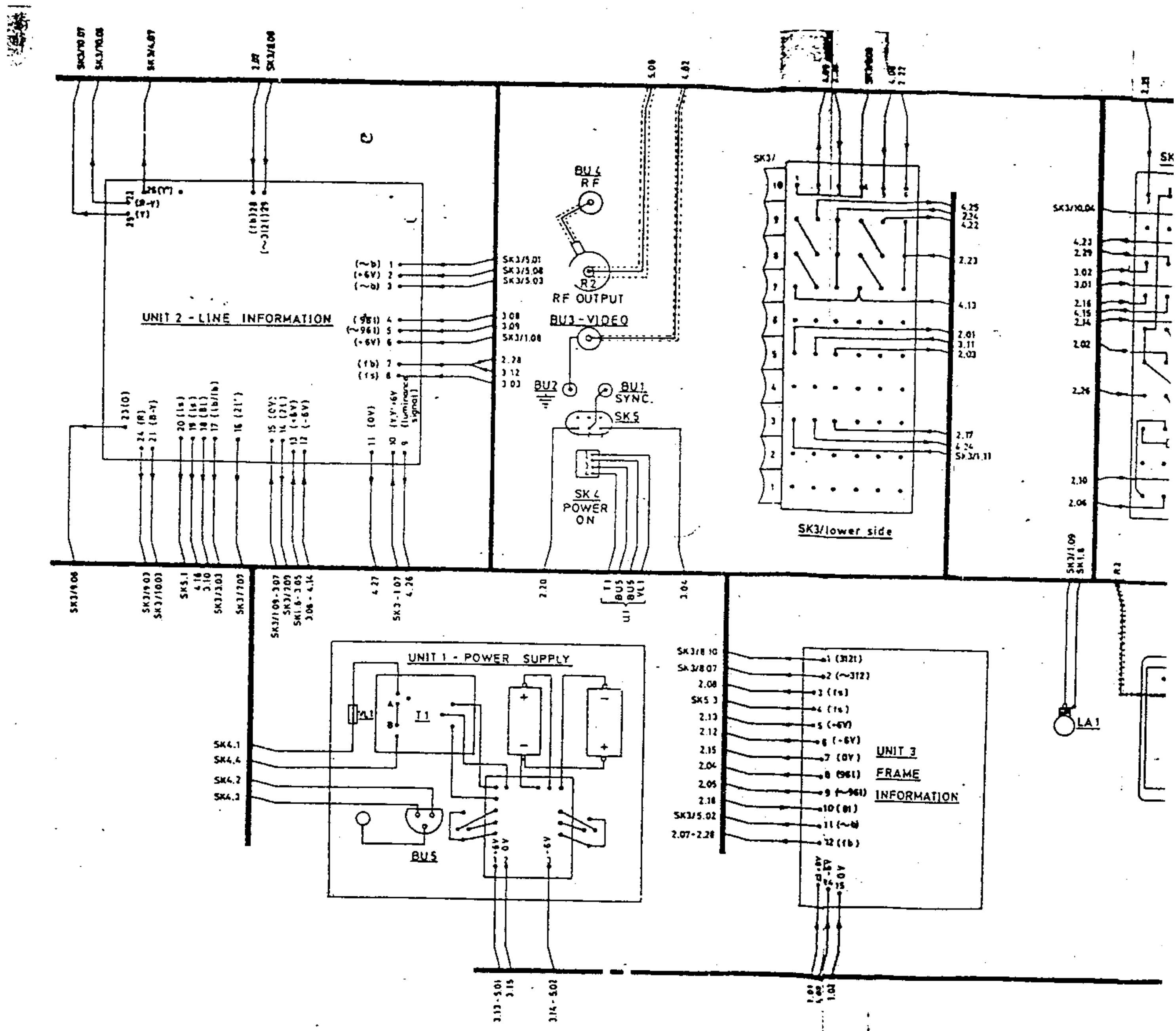
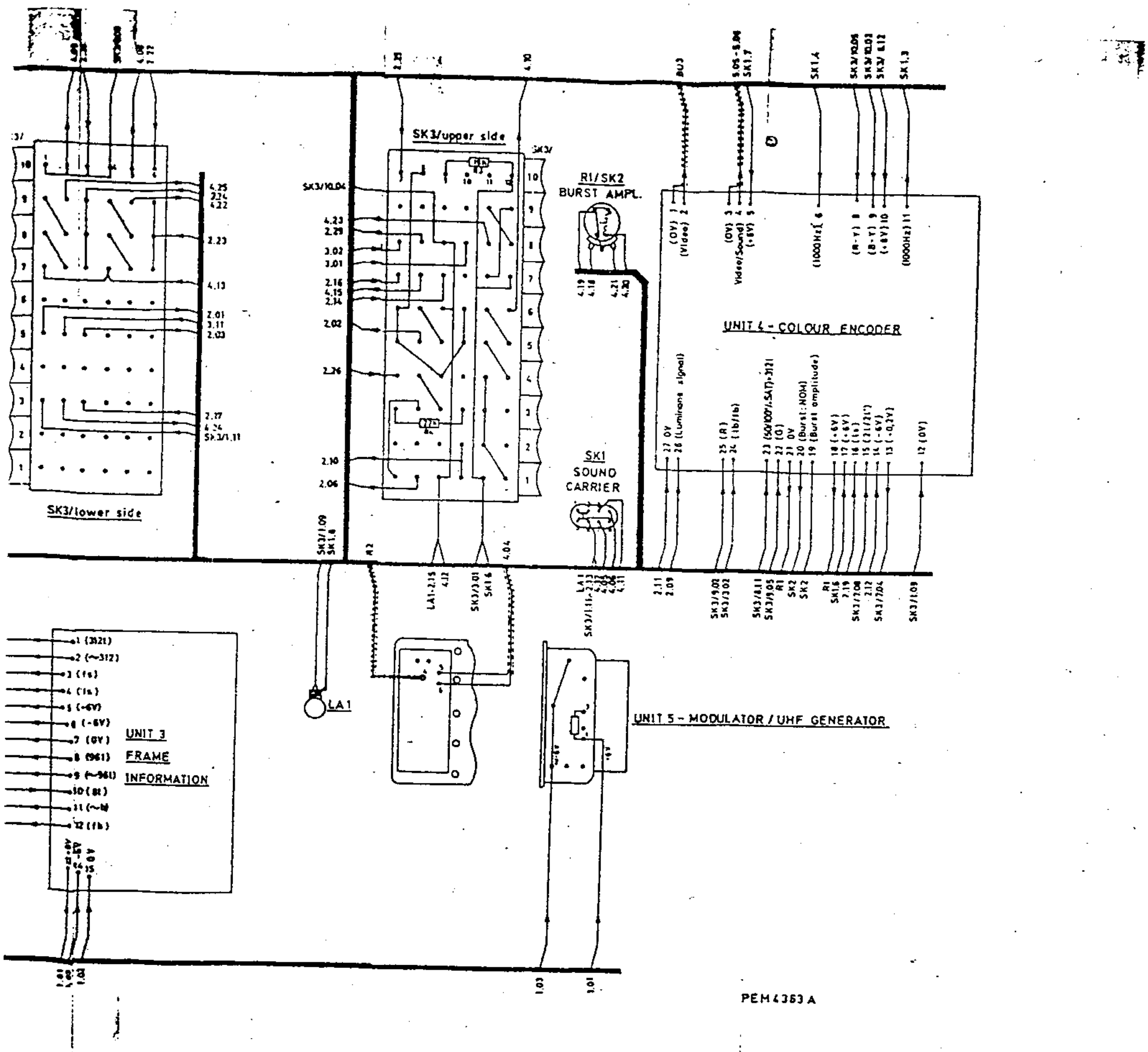
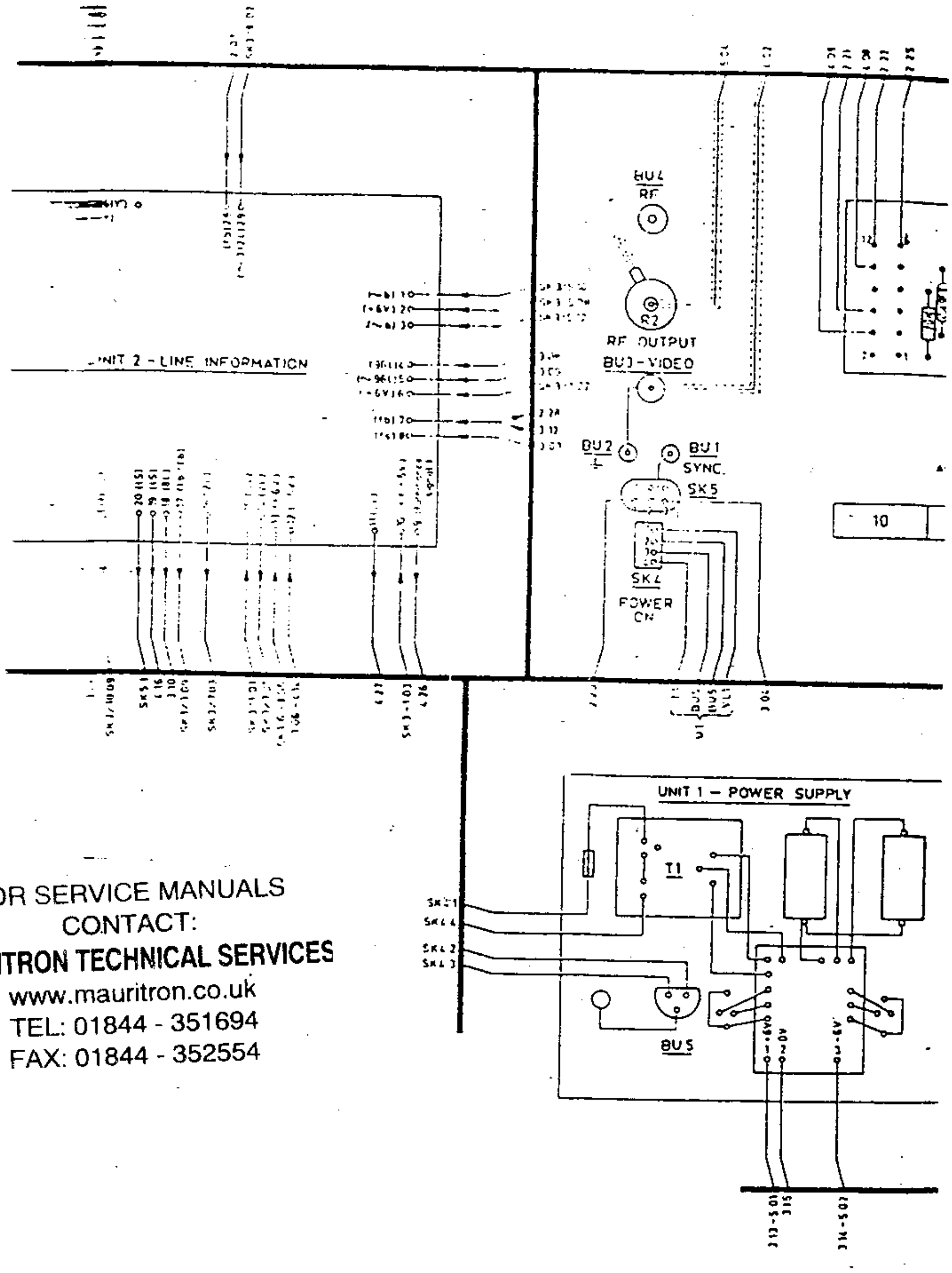
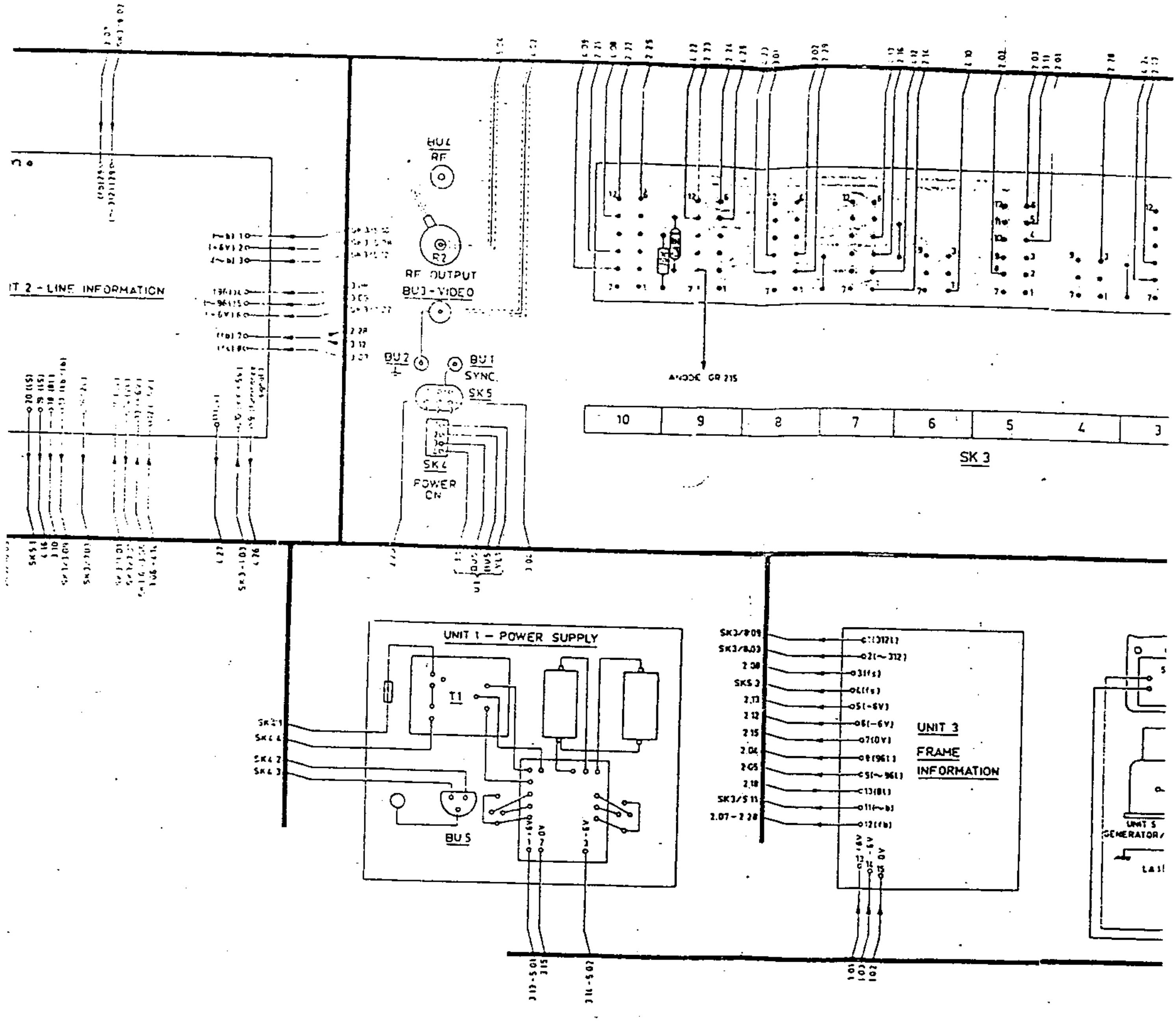


Fig. V-19a. General wiring plan (PM 5506)

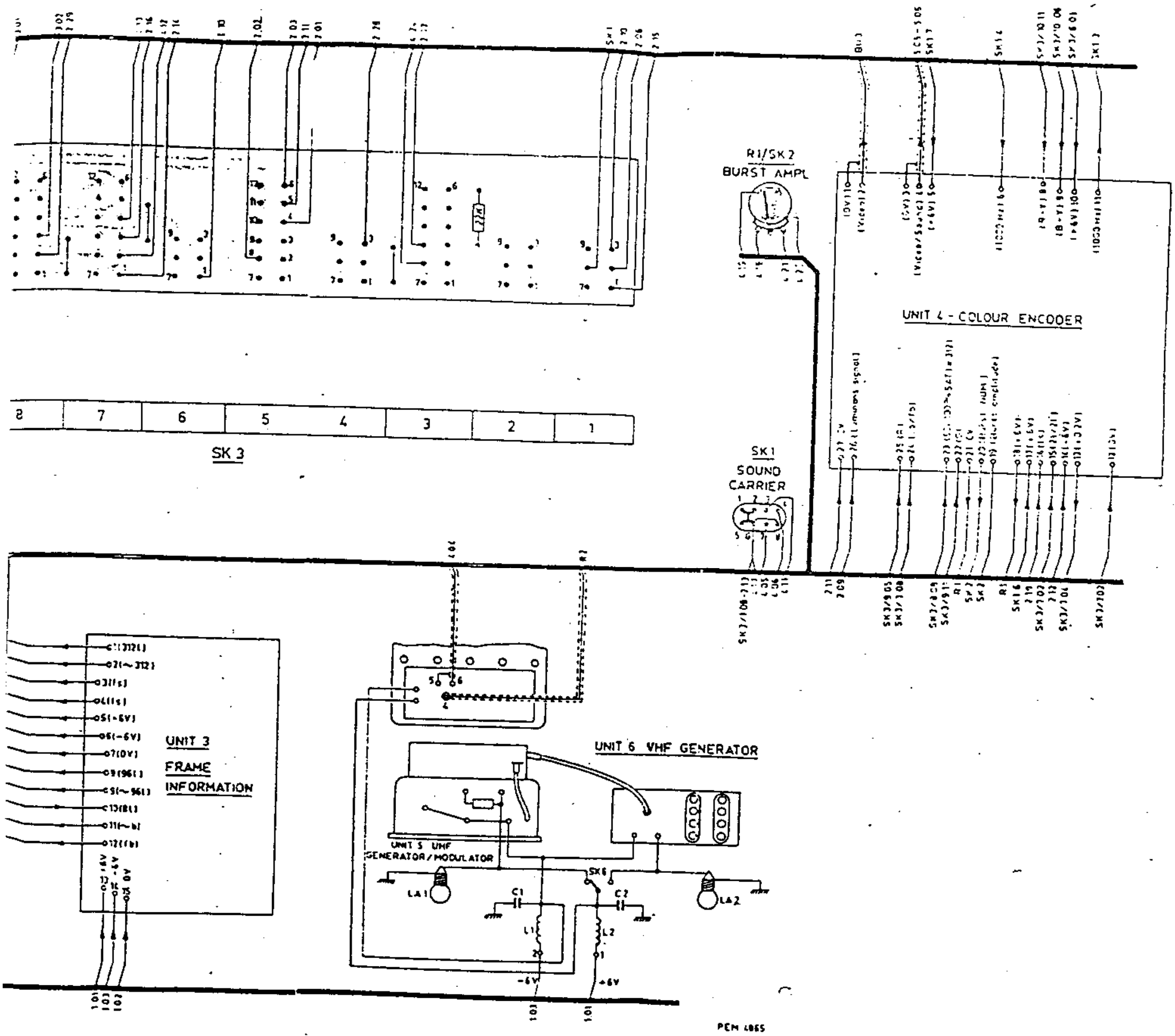

SK3/lower side
SK3/upper side
R1/SK2
BURST AMPL.
SK1
SOUND
CARRIER
UNIT 4 - COLOUR ENCODER
UNIT 3
FRAME
INFORMATION
LA1
UNIT 5 - MODULATOR / UHF GENERATOR
PEM 4363 A

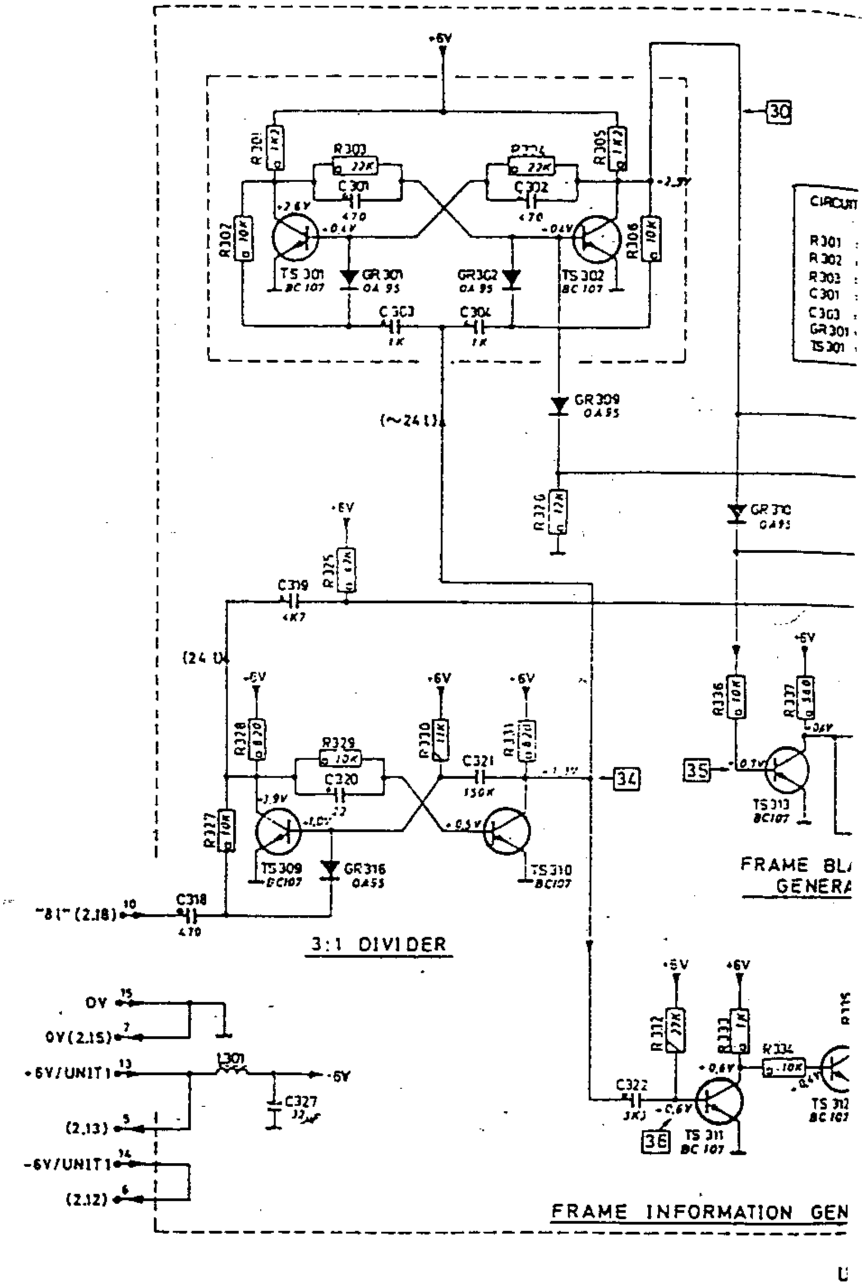


General wiring plan (PM 5508)

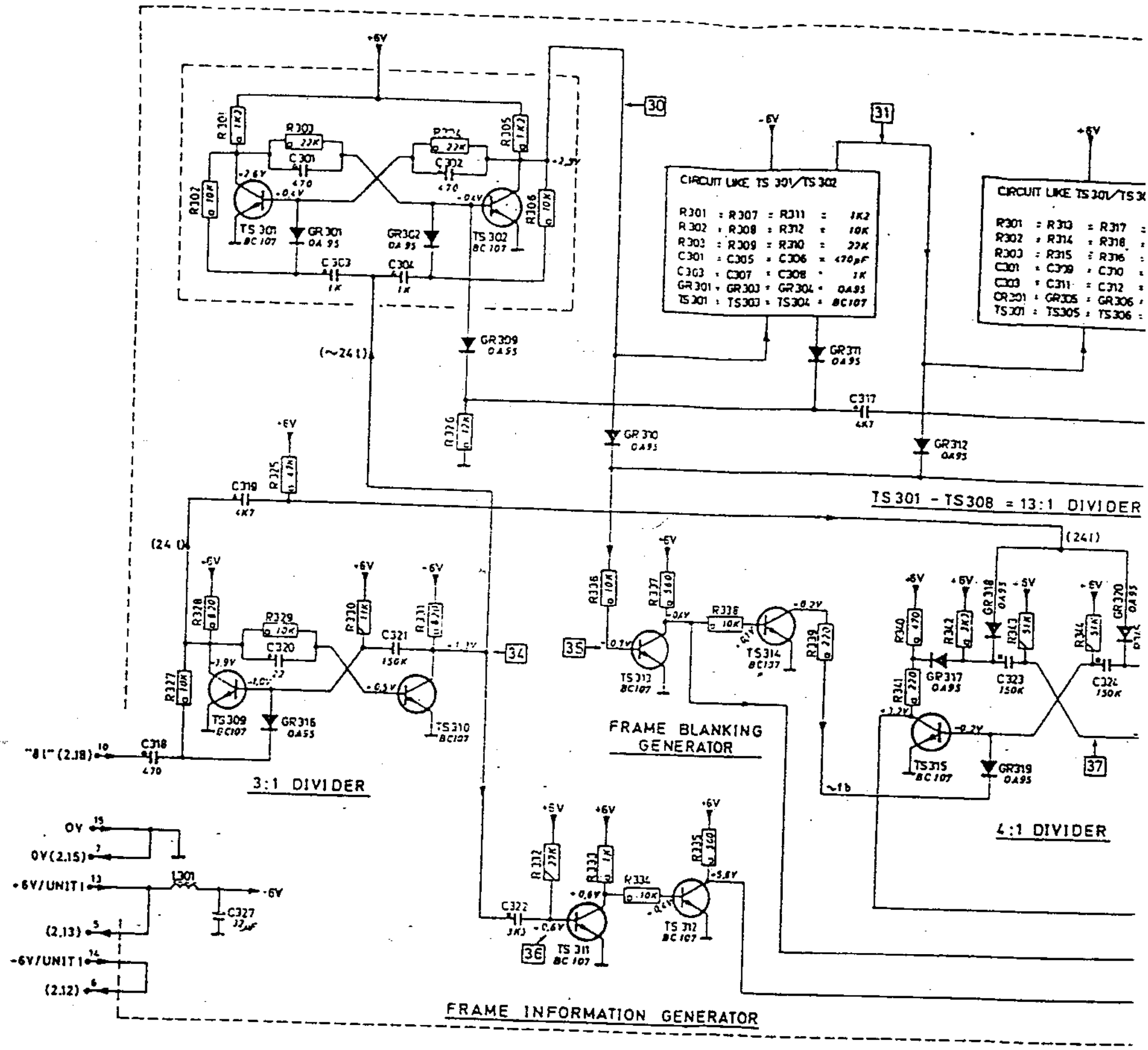


General wiring plan (PM 5508)


R1/SK2
BURST AMPL
UNIT 4 - COLOUR ENCODER
SK 3
SK1
SOUND
CARRIER
UNIT 3
FRAME
INFORMATION
UNIT 6 VHF GENERATOR
UNIT 5 UHF
GENERATOR / MODULATOR
SK6
LA1
LA2
C1
C2
L1
L2
-6V
+6V
PEM 4865

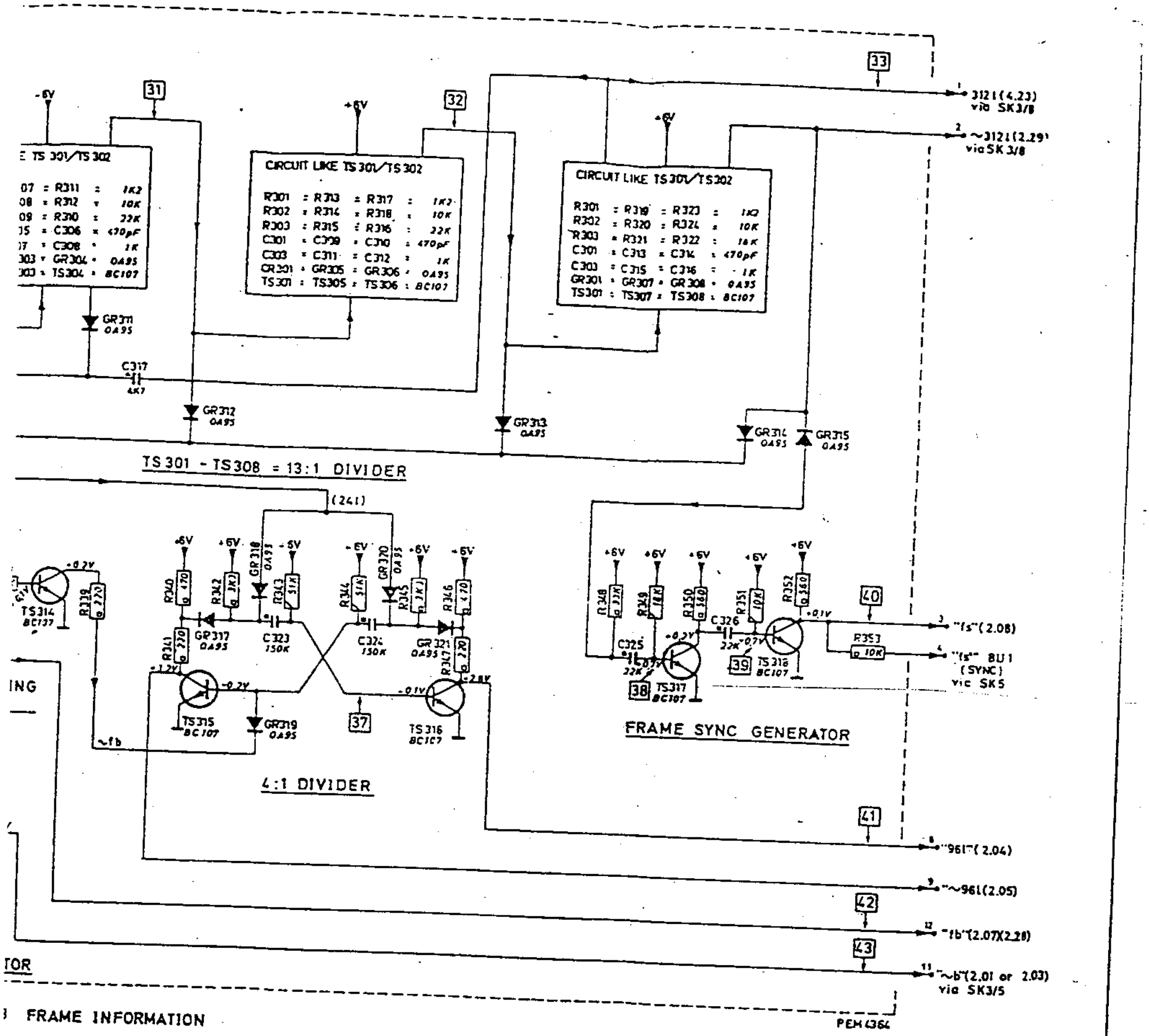


Erratum: BC 107 → BC 207 B (from version /05)
R 330 → 10K5 1% (from version /03)

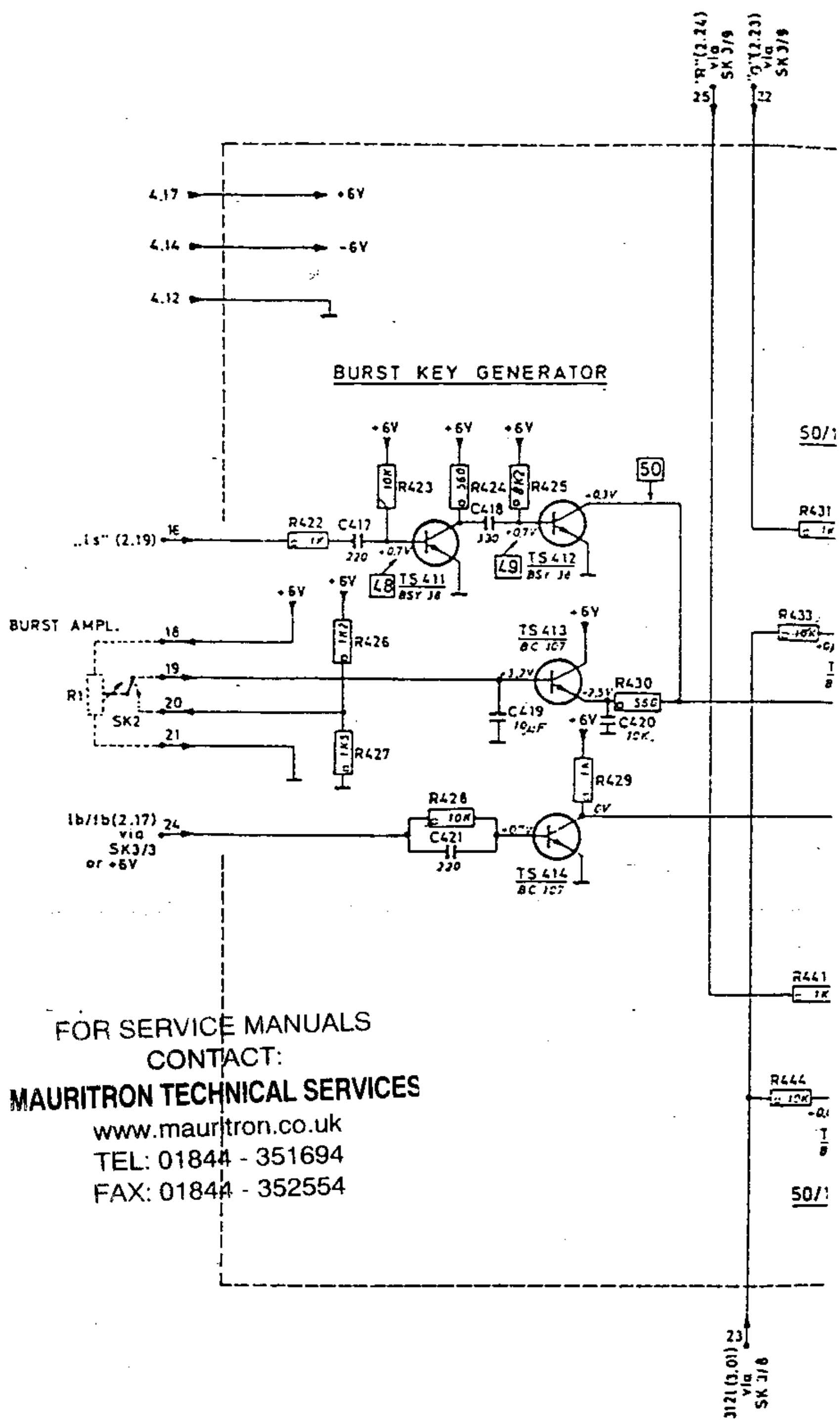


UNIT 3 FRAME INFORMATION

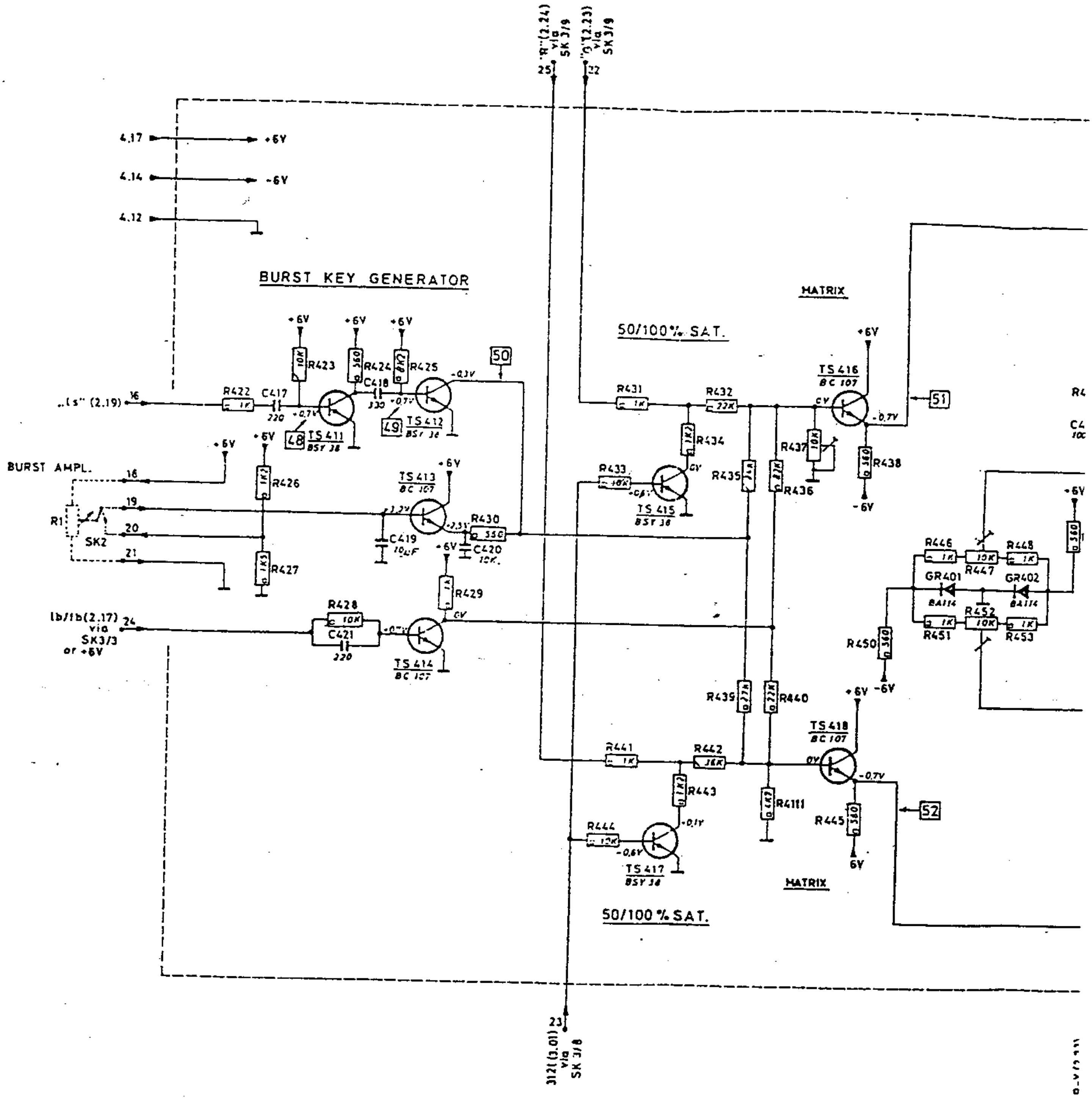
Erratum: BC 107 → BC 207 B (from version /05)
R 330 → 10K5 1% (from version /03)



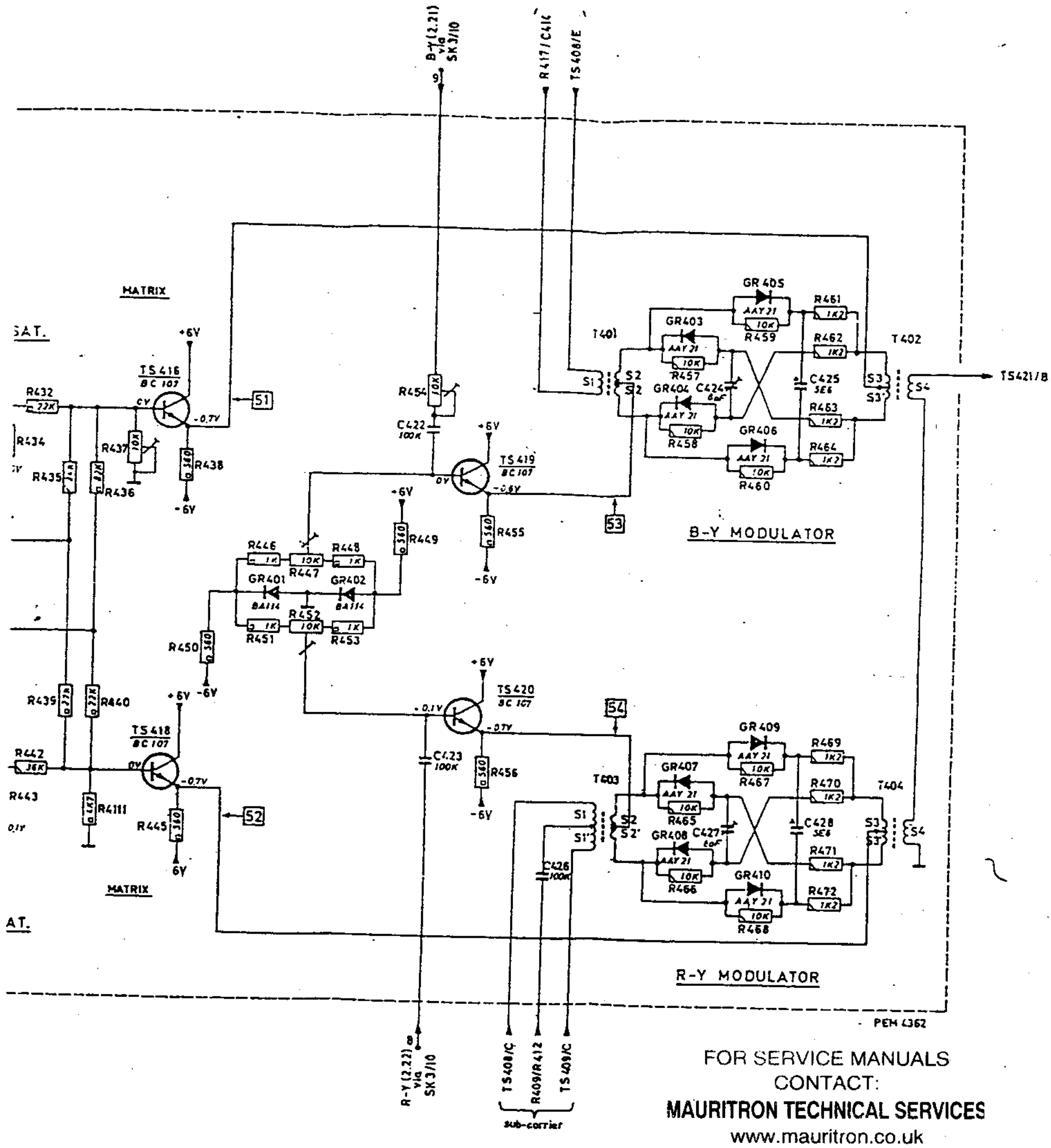
TS 301 - TS308 = 13:1 DIVIDER
CIRCUIT LIKE TS301/TS302
CIRCUIT LIKE TS301/TS302
4:1 DIVIDER
FRAME SYNC GENERATOR
FRAME INFORMATION
PEH 4364



Erratum: BC 107 → BC 207B (from version /05)



Erratum: BC 107 → BC 207B (from version /05)



MATRIX
B-Y MODULATOR
R-Y MODULATOR
TS421/B
PEH 4362
sub-carrier