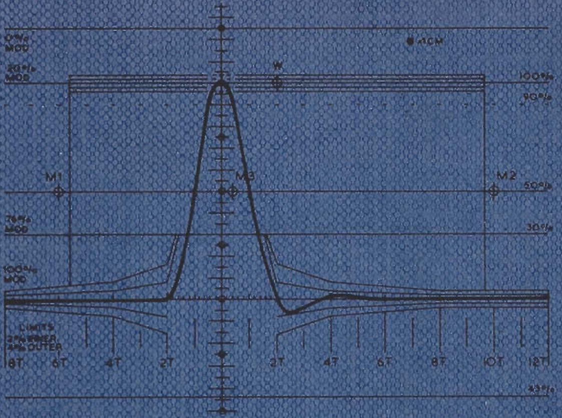

Short-Form Video Test Procedures

DC Lees

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Division

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CONTENTS

INTRODUCTION

This booklet summarises the BBC test procedures for System I (UK 625-line) PAL video signal transmission which are fully described in Technical Instruction P2 – 'Measurement and Test Procedures'.

Included are:

- Test Signals
- Test Procedures
- Block Diagrams of Test Equipment
- List of Suitable Test Equipment Types
- dB Conversion Tables

Most of the more frequently made video tests are covered in this booklet, but it is intended to extend the range in future issues as the relevant additions are made to Technical Instruction P2.

The booklet has been prepared under the direction of the S.E.C.(Tel.) Sub-Committee on Signal Specification and Measurement.

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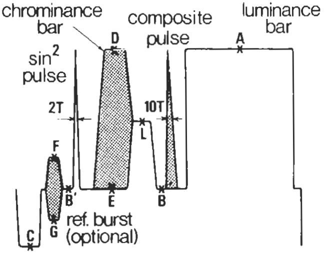
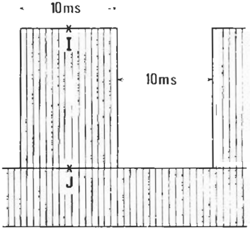
LONDON W1A 1AA

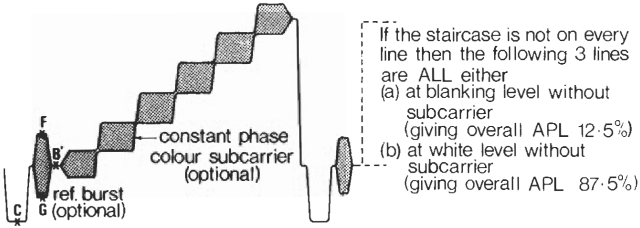
TEST SIGNALS



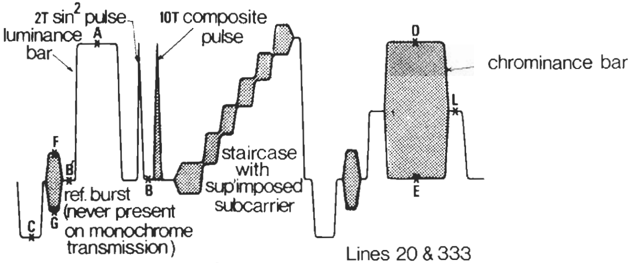
Line–Repetitive Chrominance – Luminance 2T pulse and Bar Test Signal



50 Hz Bar Test Signal



Line – Repetitive Staircase Test Signal



Lines 19 & 332

Lines 20 & 333

Insertion Test Signal (ITS)

'When you can measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meagre and unsatisfactory kind: it may be the beginning of knowledge but you have scarcely, in your thoughts, advanced to the stage of science.'

William Thompson, Lord Kelvin.
1824 – 1907

525 line ITS

Country	National tx tests	Other National uses	International tx tests
Canada	both fields 17, 18	both fields 15, 16, 19, 20, 21	both fields 17
Japan	both fields 17, 18	both fields 16, 19, 20, 21	both fields 17
USA	field 2 only 20	both fields 15, 16, 17, 18, 19, 21 field 1 20	field 2 only 20

TEST PROCEDURES

NOTES

1. Line repetitive (also known as full-field) test signals can, in general, be expected to give more accurate results than insertion test signals (ITS). In many cases however ITS measurements may be the only ones which it is practicable to make, and so both are covered where relevant. When an ITS is used it is desirable, unless otherwise stated, that it be associated with a near 50% average picture level (APL) video signal, and that its use be recorded by the tester.

2. Accuracy of measurement of some parameters may also be influenced by the type of test equipment available. In these cases therefore 'preferred' and 'alternative' measurement techniques are shown.

3. Full information on a particular test can be obtained by consulting the relevant Video Test Procedure (VTP) in Technical Instruction P2.

4. The term 'waveform monitor' as used in this text is intended to cover suitable general purpose oscilloscopes also.

5. The measurement methods described are all of the 'manual' type. However some of the parameters considered can also be measured by 'semi-automatic' methods, (e.g. by observing the digital outputs from the measuring units which form part of an automatic monitoring equipment), or by completely automatic methods, (e.g. data logging). Since the automatic measuring units have, in general, been designed around the 'manual' measurement definitions, it follows that the results obtained for a particular parameter and test signal, should be largely independent of whether a 'manual', 'semi-automatic' or 'automatic' method of measurement is employed.

6. Waveform sketches in the following text are not to scale.

7. The amplitude of the signal applied to the device under test is assumed to be that which it was designed normally to accept. Additional tests for non-linear distortions may be carried out at +3 dB in some circumstances.

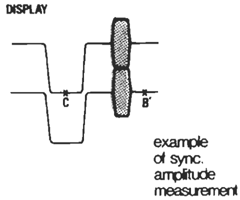
8. It is desirable that the gain of the device under test be checked, and if necessary corrected, before carrying out any further tests.

WAVEFORM AMPLITUDE AND GAIN (V.T.P.s 1.1 & 1.2)

TEST SIGNALS
Line-repetitive Pulse and Bar, or ITS.

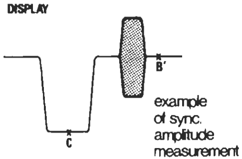
PREFERRED METHOD
Addition, before display, of known amplitude square-wave to signal to be measured. Block Diagram 1a shows equipment.

PROCEDURE
Adjust square-wave amplitude to bring relevant pair of test signal points (see DEFINITIONS below) to same level.



ALTERNATIVE METHOD
Direct display on waveform monitor of signal to be measured. Block Diagram 1b shows equipment.

PROCEDURE
Measure levels of relevant pair of test signal points (see DEFINITIONS below) in conventional way.



DEFINITIONS

Picture amplitude:	(A – B) volts
Sync. amplitude:	(B' – C) volts
Picture : sync. ratio:	$\frac{100}{(A-B)+(B'-C)} \times \left[(A-B):(B'-C)\right]$
Video amplitude:	(A–C) volts
Burst amplitude:	(F–G) volts
Chrominance amplitude:	(D–E) volts
Gain:	$20 \log \frac{A-B}{0{\cdot}7^*}$ dB

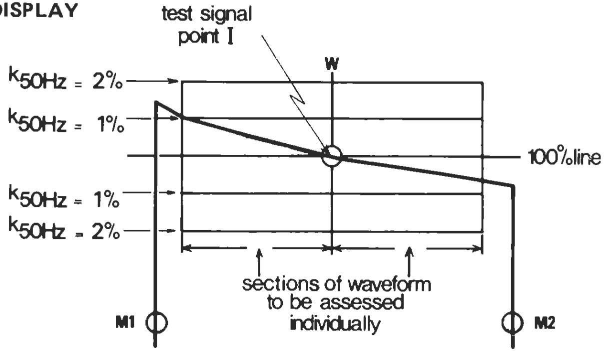
* or 'Picture amplitude' at input of equipment under test if this differs from 0·7v.

TEST SIGNAL
50 Hz Bar.

METHOD
Assessment of signal to be measured against K-rating graticule. Block Diagram 2 shows equipment.

PROCEDURE
Set waveform monitor gain and vertical shift such that test signal point J (blank level) is on the 0% line (numbers appearing on right hand side of graticule), and test signal point I is on the 100% line. Set time-base and horizontal shift such that bar edges pass through graticule points M1 and M2.

DISPLAY



DEFINITION
K_{50Hz} is quantified by the maximum departure in bar-top level from the level at bar centre (test signal point I), assessed against the above graticule lines.

In example shown $K_{50\ Hz} = 1\ \%$

TEST SIGNAL

Luminance bar of line-repetitive Pulse and Bar.

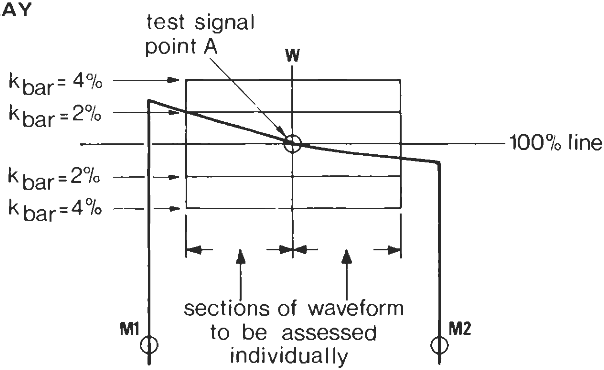
METHOD

Assessment of signal to be measured against K-rating graticule. Block Diagram 2 shows equipment.

PROCEDURE

Set waveform monitor gain and vertical shift such that test signal point B (blank level) is on the 0% line (numbers appearing on right hand side of graticule), and test signal point A is on the 100% line. Set time-base and horizontal shift such that bar edges pass through graticule points M1 and M2.

DISPLAY



DEFINITION

K_{bar} is quantified by the maximum departure in bar-top level from the level at bar centre, (test signal point A), assessed against the above graticule lines.

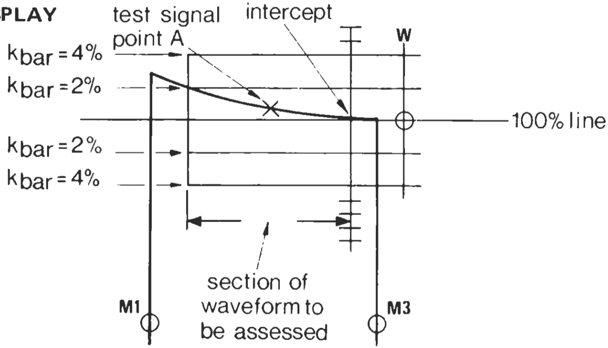
In example shown K_{bar} = 2%.

TEST SIGNAL
Luminance bar of ITS.

METHOD
Assessment of signal to be measured against K-rating graticule. Block Diagram 2 shows equipment.

PROCEDURE
Set waveform monitor gain and vertical shift such that test signal point B (blank level) is on the 0% line (numbers appearing on right hand side of graticule), and test signal point A is on the 100% line. Set time-base and horizontal shift such that bar edges pass through graticule points M1 and M3. Adjust vertical shift such that the trace passes through the intercept of the 100% graticule line with the vertical graticule scale.

DISPLAY



DEFINITION
K_{bar} (ITS) is quantified by the maximum departure in bar-top level from the level at the graticule intercept point, assessed against the lines to the left thereof only.

In example shown K_{bar} (ITS) = 2%.

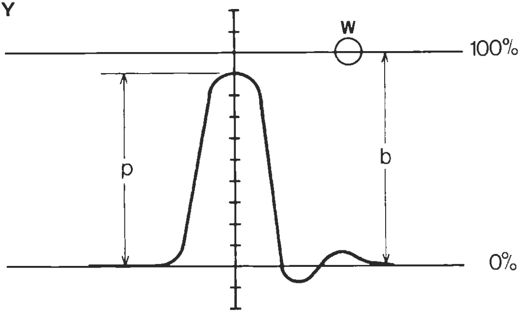
PULSE/BAR RATIO, PULSE-BAR INEQUALITY, $K_{pulse/bar}$ (V.T.P. 2.1)

TEST SIGNALS
2T pulse and luminance bar of line-repetitive Pulse and Bar, or ITS.

METHOD
Assessment of signal to be measured against K-rating graticule. Block Diagram 2 shows equipment.

PROCEDURE
Set waveform monitor gain and vertical shift such that the test signal point B (blank level) is on the 0% line (numbers on right hand side of graticule), and test signal point A (bar-top centre) is on the 100% line, (thus normalising the bar amplitude (b) to 100%). Assess height of 2T pulse (p) against vertical graticule scale.

DISPLAY



DEFINITIONS

Pulse/Bar ratio: $p/_b \times 100\,\%$ (In example P/B ratio = 90%)

Pulse-Bar inequality: $(p-b) \times 100\%$ (In example P–B ineq. = −10%)

$K_{pulse/bar}$: $\frac{1}{4}\left|\frac{p-b}{p}\right|^{*} \times 100\%$ (In example $K_{p/b} = 2{\cdot}8\%$)

* Note that the pulse is taken as reference and not the bar.

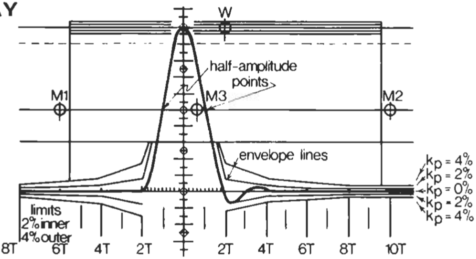
K_{pulse} (V.T.P. 2.1)

TEST SIGNALS
2T pulse of line-repetitive Pulse and Bar, or ITS.

METHOD
Assessment of signal to be measured against K-rating graticule. Block Diagram 2 shows equipment.

PROCEDURE
Set waveform monitor time base velocity to 10 graticule T intervals per μs. Set horizontal shift such that the 2T pulse half-amplitude points are symmetrical with respect to the vertical scale on the graticule. Set gain and vertical shift such that the base of the pulse is on the 0% line (numbers on right hand side of graticule) and its tip is on the 100% line.

DISPLAY



DEFINITION
The graticule envelope lines represent K_p = 2% (inner) and K_p = 4% (outer). K_p is assessed by comparing deviations in pulse base against these lines, and selecting the largest value so obtained. As part of this process the horizontal shift should be adjusted to examine for deviations $>$ 12T away.

In example K_p = 2%.

OVERALL K-RATING (V.T.P. 2.1)

DEFINITION
The overall K-rating is the largest value obtained considering K_{50Hz}, K_{bar}, $K_{p/b}$ and K_p. K_{50Hz} is sometimes excluded from this consideration, but if it is, the fact should be noted.

CHROMINANCE-LUMINANCE GAIN INEQUALITY (V.T.P. 2.2)

TEST SIGNALS

Luminance and chrominance bars of line-repetitive Pulse and Bar, or ITS.

PREFERRED METHOD

Direct measurement on a meter type 'gain tester'. (Applicable to inequalities of up to ±30%).
Block Diagram 3 shows equipment.

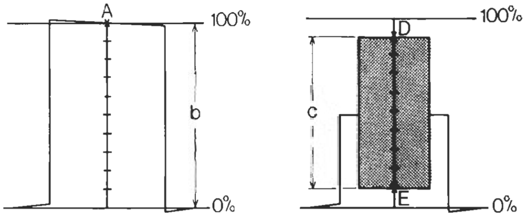
ALTERNATIVE METHOD

Assessment of signal to be measured against K-rating (or other suitable) graticule. Block Diagram 2 shows equipment.

PROCEDURE

Set waveform monitor gain and vertical shift such that test signal point B (blank level) is on the 0% line, and test-signal point A (luminance bar top centre) is on the 100% line, (thus normalising the luminance bar amplitude (b) to 100%). Assess peak-to-peak amplitude of chrominance bar (d) against the vertical graticule scale.

DISPLAYS (ALTERNATIVE METHOD)



DEFINITIONS

Chrom.-lum. gain ineq.: $\left[\frac{\text{Chrom gain}}{\text{Lum. gain}} - 1\right] \times 100\%$

which can also be expressed as:

$$\left[\frac{(D-E)}{(A-B)} - 1\right] \times 100 \text{ or } \left[\frac{c}{b} - 1\right] \times 100\%$$

In example chrom.-lum. gain ineq. = −20%.

CHROMINANCE-LUMINANCE DELAY INEQUALITY (V.T.P. 2.2)

TEST SIGNALS

10T composite pulse of line-repetitive Pulse and Bar, or ITS.

PREFERRED METHOD

Direct measurement on a meter type 'delay tester'.
Block Diagram 3 shows equipment.

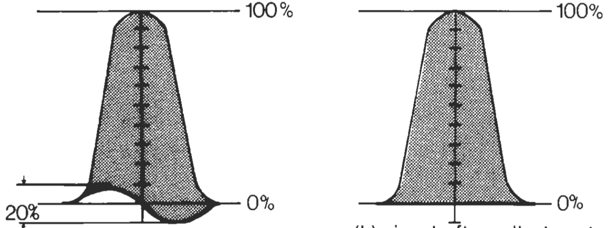
ALTERNATIVE METHOD

Transmission, before display, of signal to be measured through a calibrated 'delay tester'. Block Diagram 4 shows equipment.

PROCEDURE

Adjust 'tester' controls for minimum irregularities on the base of the displayed composite pulse.

DISPLAYS (ALTERNATIVE METHOD)



(a) signal to be measured.

(b) signal after adjustment of "tester."

DEFINITIONS

Chrom.-lum. delay ineq.: Chrom.delay − Lum.delay ns (thus chrom. 'lag' gives positive value: chrom. 'lead' gives negative value.

Note that when distortion is of the simple (delay only) form (a) above an approximate inequality magnitude may be obtained by multiplying the peak-to-peak value of irregularity on the base of the 10T pulse in % by 6, the result being in ns.

In example chrom.-lum. delay ineq. of (a) = +120 ns.

SYNC. NON-LINEARITY (STATIC) (V.T.P. 3.1)

TEST SIGNAL

Any signal in which the A.P.L. can be varied from low (≏ 10%) to high (≏ 90%), e.g. line-repetitive staircase.

METHOD

Measurement of sync. amplitude error of signal to be measured corresponding to low and high values of A.P.L. Block Diagram 5 shows equipment.

PROCEDURE

Determine expected amplitude of undistorted sync. at point of measurement, e.g. by multiplying the picture amplitude, (found by the procedure summarised on p.6 of this booklet), by $^3/7$. Set A.P.L. of test signal to low and check (by methods summarised on p.6), the sync. amplitude $(B'-C)$ of the signal to be measured. Change the A.P.L. to high and check $(B'-C)$ again.

DEFINITION

Sync. non-linearity (static) is quantified by the larger (in magnitude) of:

$$\left[\frac{(B'-C)\text{ low A.P.L.}}{(B'-C)\text{ expected}} - 1\right] \times 100\% \text{ or } \left[\frac{(B'-C)\text{ high A.P.L.}}{(B'-C)\text{ expected}} - 1\right] \times 100\%.$$

SYNC. NON-LINEARITY (TRANSIENT) (V.T.P. 3.1)

TEST SIGNAL

Any signal in which the A.P.L. can be stepped from low ($\simeq$ 10%) to high ($\simeq$ 90%), e.g. line-repetitive staircase.

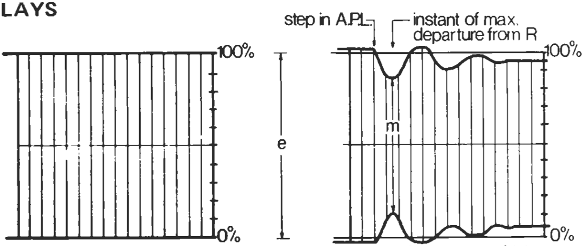
METHOD

Display of a differentiated version of the sync. pulses of signal to be measured following steps in its A.P.L. from low-to-high and high-to-low. Block Diagram 5 shows equipment.

PROCEDURE

Determine expected amplitude of undistorted sync. at point of measurement, as on previous page. Calibrate measuring gear, by passing locally generated syncs. of this amplitude through the differentiating filter, and adjusting the waveform monitor to give a convenient display (e), on the graticule. Replace local signal by signal to be measured and assess (on calibrated display) the amplitude of differentiated syncs. (m) at the instant of maximum departure from the expected undistorted value, following each step in A.P.L.

DISPLAYS



(a) cal. of display on local syncs. of expected amp

(b) step from low to high A.P.L. (shows envelope of diff. syncs. only)

DEFINITION

Sync. non-linearity (transient): $\left|\frac{m-e}{e}\right| \times 100\%$

Note that both low-to-high and high-to-low A.P.L. steps must be examined to determine the value of m.

In example sync. non-linearity (transient) = 24%.

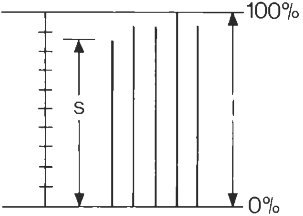
LUMINANCE NON-LINEARITY (V.T.P. 3.2)

TEST SIGNALS
Line-repetitive staircase (preferably without superimposed subcarrier), or ITS (preferably with controllable A.P.L.).

METHOD
Display of differentiated version of staircase section of signal to be measured with both low and high values of A.P.L. Block Diagram 6 shows equipment.

PROCEDURE
Set waveform monitor time-base to display differentiated risers of staircase. Set gain and vertical shift such that the largest differentiated riser (l) gives a convenient display. Assess height of smallest differentiated riser (s). Change to other value of test signal A.P.L. and repeat procedure.

DISPLAY



DEFINITION
Luminance non-linearity is quantified by the larger (in magnitude) of:

$$\left[1 - \frac{s}{l}(\text{low A.P.L.})\right] \times 100\% \text{ or } \left[1 - \frac{s}{l}(\text{high A.P.L.})\right] \times 100\%$$

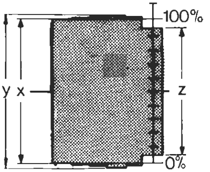
In example luminance non-linearity = 12%.

DIFFERENTIAL GAIN (V.T.P. 3.3)

TEST SIGNALS
Line-repetitive staircase (with superimposed subcarrier), or ITS (preferably with controllable A.P.L.).

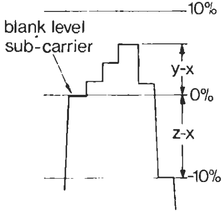
METHOD A (Band-pass filter)
Transmission of signal to be measured (with both high and low values of A.P.L.) through a band-pass filter before display. Block Diagram 7a shows equipment.

PROCEDURE
Set waveform mon. such that the staircase blank level tread s-c gives a convenient display amp. (x). Assess amp. of s-c on other treads which departs most from x. Change to other value of test signal A.P.L. and repeat.



METHOD B (Vectorscope)
Display of signal to be measured (with both high and low values of A.P.L.) on a Vectorscope. Block Diagram 7b shows equipment.

PROCEDURE
Select 'VECTOR PAL', 'CH.A', 'FULL-FIELD' or 'VITS', 'Aϕ'. Set 'CH.A GAIN' such that mean vector equals grat. radius. Select 'DIFF. GAIN' and identify staircase blank-level tread s-c vector. Select 'VECTOR PAL' and adjust 'CH.A GAIN' such that blank level vector is on grat. radius. Select 'DIFF. GAIN' and set blank level s-c amp. to 0%, then assess largest departure therefrom. Change to other value of A.P.L. and repeat.



DEFINITION
Differential gain is quantified by the largest (in magnitude) of:

$$\left[\frac{y-x}{x}\left(\begin{matrix}\text{low or}\\ \text{high A.P.L.}\end{matrix}\right)\right] \times 100\% \text{ or } \left[\frac{z-x}{x}\left(\begin{matrix}\text{low or}\\ \text{high A.P.L.}\end{matrix}\right)\right] \times 100\%$$

In example differential gain = −10%.

TEST SIGNALS

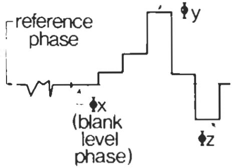
Line-repetitive staircase (with superimposed subcarrier) or ITS (preferably with controllable A.P.L.).

METHOD A (Signal analyser)

Transmission of signal to be measured (with both high and low values of A.P.L.) through a signal analyser before display.
Block Diagram 7a shows equipment.

PROCEDURE

Set phase of staircase blank-level tread subcarrier (Φ_x) to reference, then adjust phase shifter to determine phase of subcarrier on other treads which departs most from Φ_x. Change to other value of test signal A.P.L. and repeat procedure.

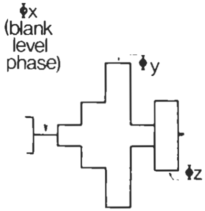


METHOD B (Vectorscope)

Display of signal to be measured (with both high and low values of A.P.L.) on a Vectorscope. Block Diagram 7b shows equipment.

PROCEDURE

Select 'CH.A', 'FULL-FIELD' or 'VITS', 'Aϕ' and 'DIFF. PHASE'. Set 'CAL. PHASE' to 0, 'CH.A GAIN' to 'MAX' and 'CAL', 'DISPLAY' to 'BOTH'. Adjust 'CH.A PHASE' to bring staircase blank-level phase traces coincident, then adjust 'CALIBRATED PHASE' to determine max. departure therefrom. Change to other value of A.P.L. and repeat procedure.



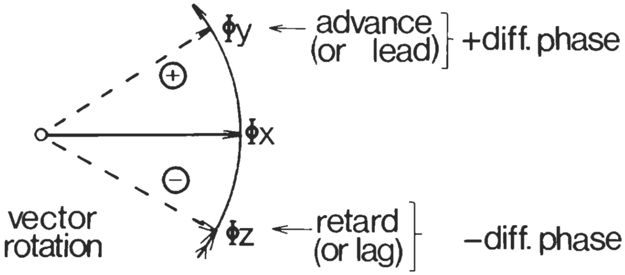
DEFINITION

Differential phase is quantified by the largest (in magnitude) of:

$$\left[\Phi_y - \Phi_x \begin{pmatrix}\text{low or}\\ \text{high A.P.L.}\end{pmatrix}\right]^\circ \quad \text{or} \quad \left[\Phi_z - \Phi_x \begin{pmatrix}\text{low or}\\ \text{high A.P.L.}\end{pmatrix}\right]^\circ$$

where: Φ_y is max. phase advance of subcarrier ref. Φ_x.

Φ_z is max phase retard of subcarrier ref. Φ_x.



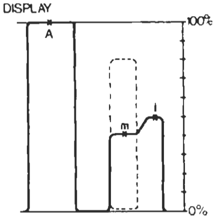
CHROMINANCE-LUMINANCE INTERMODULATION
(Crosstalk or Axis Shift) **(V.T.P. 3.4)**

TEST SIGNALS
Luminance and chrominance bars of line-repetitive Pulse and Bar, or ITS.

PREFERRED METHOD
Direct measurement on a meter type 'gain tester'. (Applicable to values of up to ±30%).
Block Diagram 3 shows equipment.

ALTERNATIVE METHOD
Transmission of signal to be measured through a subcarrier stop filter before display on a waveform monitor.
Block Diagram 8 shows equipment.

PROCEDURE
Set waveform monitor gain and vertical shift such that test signal point B (blank-level) is on the 0% line, and test signal point A (luminance bar top centre) is on the 100% line, (thus normalising the luminance bar amplitude to 100%). Examine section of test signal allocated to the chrominance bar and determine its mean value (m).



DEFINITION

Chrom.-lum. intermod.: $\frac{m-l}{A-B} \times 100\%$

where:
l is mean level of pedestal following chrom. bar.
m is mean level of chrom. bar (after filtering off s-c).

In example chrom.-lum. intermod. = −10%.

SIGNAL/CONTINUOUS RANDOM NOISE RATIO

also see p.39

(V.T.P. 4.1)

METHOD A1 (Ungated)

Block Diagram 9a shows equipment.

PROCEDURE

Check gain of Device Under Test (see page 6). If in error correct (if possible). Terminate input to Device. Calibrate Noise Meter. For unweighted and luminance weighted measurements select 10 kHz high-pass and 5 MHz low-pass filters together with appropriate weighting network. For chrominance weighted measurements select 'full-band' in place of 5 MHz. Adjust calibrated controls to bring meter to centre reading.

METHOD A2 (Line-gated)

Block Diagram 9b shows equipment.

PROCEDURE

Check Device Under Test gain as above. Ensure that any video signal from the Device Under Test is of constant level during the active line periods and that syncs (internal or external) are available for gating. Calibrate Noise Meter. Select filters and weighting network as above. Measure as above.

METHOD A3 (Field-gated)

Block Diagram 9c shows equipment.

PROCEDURE

Check Device Under Test gain as above. Ensure that mixed syncs (internal or external) are available for gating. Calibrate Noise Meter. Select measurement line. Select 'full-band' for unweighted measurement, or relevant weighting network. Measure as above.

DEFINITION

The calibrated meter controls give the ratio of p-p picture to r.m.s. noise in dB. Note that the meters assume a Picture Amplitude of 0·7 volts at the point of measurement.

An approximate figure can be obtained by direct measurement on a waveform monitor of the ratio of Picture Amplitude to peak-to-peak noise (preferably with the time base stopped). 17 dB should be added to this figure to obtain a result in p-p picture to r.m.s. noise terms.

SUBJECTIVE ASSESSMENT OF PICTURES (CCIR Rec. 500)

PREFERRED VIEWING CONDITIONS

Ratio of viewing distance to picture height:	6
Peak luminance on the screen (cd/m^2):	70 ± 10
Ratio of behind monitor luminance to peak screen luminance:	0.01
Other room illumination:	low

PROCEDURE

The appropriate scale should be selected from the tables below. The scale title should always be quoted with the results. To compare quality or impairment grading assessments with others obtained using the obsolescent 6-point scales the following approximation may be used:

$$A_5 = 5.8 - 0.8A_6$$

DEFINITIONS

CCIR 5-point Quality Scale	
5	Excellent
4	Good
3	Fair
2	Poor
1	Bad

CCIR 5-point Impairment Scale	
5	Imperceptible
4	Perceptible, but not annoying
3	Slightly annoying
2	Annoying
1	Very Annoying

CCIR 7-point Comparison Scale	
+3	Much better
+2	Better
+1	Slightly better
0	The same
−1	Slightly worse
−2	Worse
−3	Much worse

ADDITIONAL NOTES ON TEST PROCEDURES

ADDITIONAL NOTES ON TEST PROCEDURES

ADDITIONAL NOTES ON TEST PROCEDURES

TEST EQUIPMENT ARRANGEMENT BLOCK DIAGRAMS

NOTES

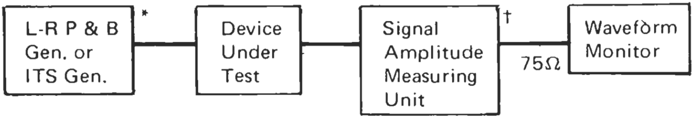
a. A list of suitable test equipment types is given on page 32.

b. It is assumed that a normal operating condition of the Device Under Test is that the Picture amplitude and impedance at its ports should be a nominal 0·7 V p-p and 75 ohms. If in practice this is not the case then it will be necessary to add to the Device Under Test amplifiers and/or attenuators, having known characteristics, in order that these conditions can be met at the interfaces with the test equipment. The characteristics of any such added equipment must of course be taken into account when deciding the performance of the Device Under Test itself.

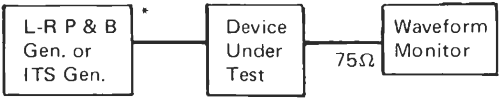
c. It is assumed that the test signal at the input interface with the Device Under Test is correct in all respects.

d. It is also assumed that the performance of any waveform monitors involved is correct. It is very desirable that this be checked prior to use. For this purpose the use of a Colour Calibrator is recommended. Small errors in chrominance-luminance gain can be corrected by means of a Waveform Monitor Equaliser. Note that this equaliser provides a 75 ohm termination and that the waveform monitor itself must be unterminated in this condition.

B.D.1 V.T.P.s 1.1 and 1.2



(a) Preferred Method

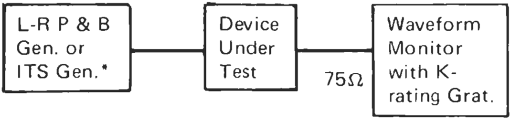


(b) Alternative Method

* In the case of V.T.P. 1.1 the necessity for a test generator will depend upon the nature of the Device Under Test.

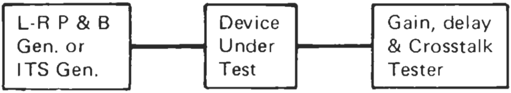
† If dB conversion is required see pages 36 and 37.

B.D.2 V.T.P.s 2.1 and 2.2 (gain inequality – alternative method)

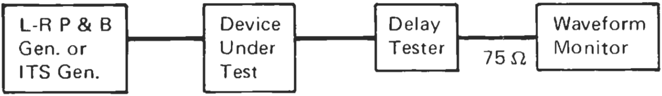


* ITS not suitable for measurement of K50 Hz.

B.D.3 V.T.P.s 2.2 (preferred method) and 3.4 (preferred method)

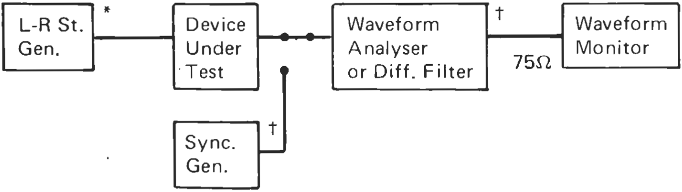


B.D.4 V.T.P. 2.2 (delay inequality – alternative method)



NOTES ON BLOCK DIAGRAMS

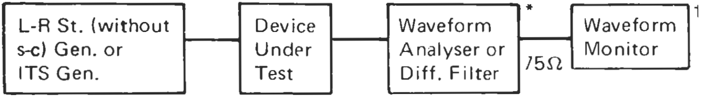
B.D.5 V.T.P. 3.1



* Any source in which the A.P.L. can be stepped from low-to-high and vice-versa is satisfactory.

† This is omitted for static measurement.

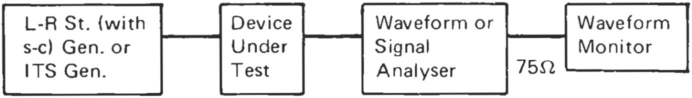
B.D.6 V.T.P. 3.2



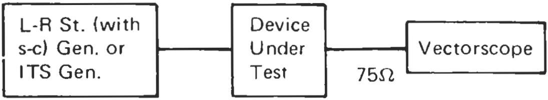
* In order to obtain greater sensitivity a Non-linearity Measuring Proc. Amp. may be inserted at this point. In this case the 75Ω termination should be removed from the waveform monitor.

† If using ITS it will be necessary to externally trigger from signal prior to filtering.

B.D.7 V.T.P. 3.3



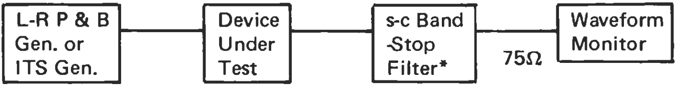
(a) Method (A)



(b) Method (B)

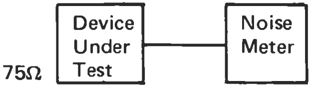
NOTES ON BLOCK DIAGRAMS

B.D.8 V.T.P. 3.4 (alternative method)

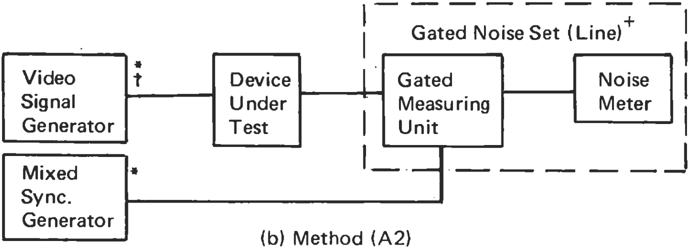


* As an alternative a low-pass filter with a cut-off frequency between 1 MHz and 3 MHz and a loss of not less than 40 dB at s-c may be used.

B.D.9 V.T.P. 4.1



(a) Method (A1)

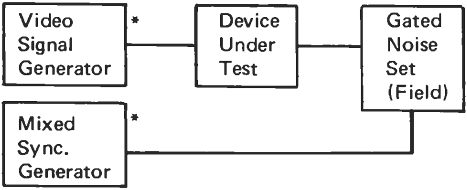


(b) Method (A2)

* The requirement for these generators will depend upon the nature of the Test Object.

† Active lines to be at a constant level.

\+ The ME1/502 has to be modified if external sync. operation is required.



(c) Method (A3)

* The requirement for these generators will depend upon the nature of the Test Object.

SUITABLE TEST EQUIPMENT TYPES

Colour Calibrator	UN2/506 or [UN2/503 or Un2/503A or UN2M/504] or [UN2/509 or UN2M/509P]
Crosstalk Tester	[TE1/513 or TE1L/517 or TE1/552 or EP1M/524] (also gain and delay)
Delay Tester	[TE1/513 or TE1L/517 or TE1/552 or EP1M/524] (also gain and crosstalk) or TE1/503
Differentiating Filter	FL1/509B or EP1M/523
Gain Tester	[TE1/513 or TE1L/517 or TE1L/552 or EP1M/524] (also delay and crosstalk)
Gated Measuring Unit	UN1M/638
Gated Noise Set (Field)	[ME1/508 or EP1M/524]
Gated Noise Set (Line)	ME1/502
ITS Generator	[GE4M/540 or GE4M/555 or GE4M/563 or GE4M/556, A or B or C]
K-Rating Graticule	TE1A/507
L-R P & B Generator	[GE2M/559 or GE2L/559] or GE4M/561
L-R St. Generator	[GE4M/520 or GE4L/520] or GE4M/561
Non-lin. Meas. Proc. Amp.	AM1/505
Noise Meter	ME1/503

Signal Amplitude Measuring Unit	UN1/511 or UN1/715 (Note that these are calibrated in dB. For conversion to volts see tables at end.)
Signal Analyser	[EP1L/508 or EP1M/508 or EP1M/508P]
Subcarrier Band Stop Filter	TE1/503 (also delay)
TV Trigger Unit	UN1/558 or UN1/702 or UN1/702 A or P or UN1/703
Vectorscope	Tektronix Models 520, 521 or 521A
Waveform Analyser	EP1M/523
Waveform Monitor Equaliser	EQ1/510 or EQ1/520 A or B or C

ADDITIONAL NOTES ON TEST EQUIPMENT TYPES

ADDITIONAL NOTES ON TEST EQUIPMENT TYPES

dB CONVERSION TABLES

GAIN

dB relative to STANDARD amplitude	per centage difference from STANDARD amplitude	voltages measured between the appropriate points shown on Test Signals page		
dB	%	Picture Amp A – B Volts	Sync Amp B′ – C Volts	Video Amp A – C Volts
+6·0	100	1·40	0·60	2·00
+5·0	78	1·24	0·53	1·78
+4·0	58	1·11	0·48	1·58
+3·0	41	0·99	0·42	1·41
+2·5	33	0·93	0·40	1·33
+2·0	26	0·88	0·38	1·26
+1·8	23	0·86	0·37	1·23
+1·6	20	0·84	0·36	1·20
+1·4	18	0·82	0·35	1·18
+1·2	15	0·80	0·34	1·15
+1·0	12	0·78	0·34	1·12
+0·9	11	0·78	0·33	1·11
+0·8	10	0·78	0·33	1·10
+0·7	8	0·76	0·32	1·08
+0·6	7	0·75	0·32	1·07
+0·5	6	0·74	0·32	1·06
+0·4	5	0·73	0·31	1·05
+0·3	4	0·72	0·31	1·04
+0·2	2	0·72	0·31	1·02
+0·1	1	0·71	0·30	1·01
STANDARD VALUE 0	0	0·70	0·30	1·00

LOSS

	dB relative to STANDARD amplitude	per centage difference from STANDARD amplitude	voltages measured between the appropriate points shown on Test Signals page		
	dB	%	Picture Amp A – B Volts	Sync Amp B′ – C Volts	Video Amp A – C Volts
STANDARD VALUE	0	0	0·70	0·30	1·00
	–0·1	1	0·69	0·30	0·99
	–0·2	2	0·68	0·29	0·98
	–0·3	3	0·68	0·29	0·97
	–0·4	4	0·67	0·29	0·96
	–0·5	6	0·66	0·28	0·94
	–0·6	7	0·65	0·28	0·93
	–0·7	8	0·65	0·28	0·92
	–0·8	9	0·64	0·27	0·91
	–0·9	10	0·63	0·27	0·90
	–1·0	11	0·62	0·27	0·89
	–1·2	13	0·61	0·26	0·87
	–1·4	15	0·60	0·26	0·85
	–1·6	17	0·58	0·25	0·83
	–1·8	19	0·57	0·24	0·81
	–2·0	21	0·56	0·23	0·79
	–2·5	25	0·52	0·22	0·75
	–3·0	29	0·50	0·21	0·71
	–4·0	37	0·44	0·19	0·63
	–5·0	44	0·40	0·17	0·56
	–6·0	50	0·35	0·15	0·50

GENERAL NOTES

GENERAL NOTES

ITS	lines from	to
Network noise	12/325	7/320
Local noise	10/323	8/321
(eventually to line(s)		6/319)