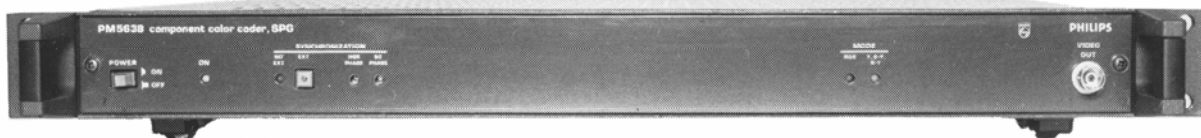


PM 5638

Component color coder, SPG

1. Photo



2. Introduction and application

The PM 5638 is a compact high performance Component Color Coder with a built-in Sync Pulse Generator. It encodes analog component signals (R, G, B or Y, R-Y, B-Y - signals) into a composite video signal with correct Sc-H phase.

It is intended for use in, for example:

- television studios,
- program production centers and
- TV laboratories.

The built-in Sync Pulse Generator may function as a stand alone SPG. It is provided with a genlock facility.

The following sync signals are separately available at the rear of the instrument:

- Black burst
- Sync
- Blanking
- Subcarrier

The PM 5638 is furthermore provided with a remote control facility which makes it possible control for example:

- Int/Ext. Sync
- Burst on/off,
- Sync on, Output signals etc.

The PM 5638 is available in:

- G-PAL,
- N-PAL,
- M-PAL and
- M-NTSC.

3. Technical data

3.1 Safety characteristics

This apparatus has been designed and tested in accordance with Safety Class I requirements of IEC Publication 348 (Safety Requirements for Electronics Measuring Apparatus), and has been supplied in a safe condition. This manual contains information and warnings which must be followed to ensure safe operation and to retain the apparatus in a safe condition.

3.2 Performance characteristics

Properties expressed in numerical values with stated tolerances are guaranteed by the Philips organization in your country. Specified non-tolerance numerical values indicate those that could be nominally expected as a mean of a range of identical instruments.

3.3 Versions

The following versions are available:

G-PAL:

625 lines, 50Hz, 4.43361875MHz subc. freq.

N-PAL:

625 lines, 50Hz, 3.582056MHz subc. freq.

M-PAL:

525 lines, 60Hz, 3.575611MHz subc. freq.

M-NTSC:

525 lines, 60Hz, 3.579545MHz subc. freq.

3.4 Inputs

3.4.1 Video inputs

Signal types:

R, G, B or Y, R-Y, B-Y.

Sync on Y-signal in Y, R-Y, B-Y mode is acceptable.

Amplitude:

700mV excl. sync and set-up.

Input impedance:

High ohmic looped-through.

Maximum DC on inputs:

+/-2V

Return loss:

> 40dB up to 7MHz

Maximum hum accepted:

1V_{PP}

Hum suppression:

> 34dB

3.4.2 Synchronization input

Amplitude:

nom. +/- 6dB

Signal types:

1. Composite video
2. Black burst
3. Composite sync

Maximum hum on signal:

100% or 1V_{PP}

Input impedance:

High ohmic looped-through

Return loss:

> 40dB up to 7MHz

3.5 Outputs

3.5.1 Video outputs

Signal types:

1. Composite video (3 outputs)
2. Black burst

In internal mode and in sync lock with correct Sc-H phase, the signal may include an 8-field reference pulse (4-field for NTSC). This signal can be switched on/off by internal jumper.

G-PAL : Line 7, field 1

N-PAL : Line 7, field 1

M-PAL : Line 8, field 1

M-NTSC: Line 11, field 1

Sync amplitude:

PAL : 300mV +/-3%

NTSC: 286mV +/-3%

Sync rise/fall time:

PAL : 230nsec. +/-20nsec.

NTSC: 140nsec. +/-15nsec.

Burst amplitude:

PAL : 300mV +/-4%

NTSC: 286mV +/-4%

Burst phase accuracy:

+/-2°

Output impedance:

75ohms +/-1%

Return loss:

Video outputs: > 34dB up to 7MHz

Black burst : > 36dB up to 7MHz

Isolation between outputs:

> 36dB up to 5MHz

Residual subcarrier:

< 2.0mV (3.5mV_{PP} for black burst)

Stability Line/Subc. (internal mode):

Jitter: Typ. +/-2°

Drift : Typ. +/-2°

3.5.2 Sync outputs

COMPOSITE SYNC

Amplitude:

4V +/-0.4V_{PP}

Rise/fall time:

200nsec.

Output impedance:

75ohms

Return loss:

> 26dB up to 4MHz

Line sync pulse width:

4.7 +/-0.2usec.

Front porch width:

1.5 +/-0.2usec.

Equalizing pulses width:

G,N-PAL : 2.35 +/-0.15usec.

M-PAL/NTSC: 2.28 +/-0.15usec.

Serration pulses width:

4.7 +/-0.2usec.

Number of serration pulses:

G,N-PAL : 5

M-PAL/NTSC: 6

Number of equalizing pulses:

G,N-PAL : 5+5

M-PAL/NTSC: 6+6

COMPOSITE BLANKING

Amplitude:

4V +/-0.4V_{PP}

Rise/fall time:

200nsec.

Output impedance:

75ohms

Return loss:

> 26dB up to 4MHz

Line blanking duration:

G,N-PAL : 12.0 +/-0.3usec.

M-PAL/NTSC: 11.0 +/-0.2usec.

Field blanking duration:

G,N-PAL : 25H + 12usec.

M-PAL/NTSC: 21H + 11usec.

SUBCARRIER

Amplitude:

2V +/-0.2V_{PP}

Output impedance:

75ohms

Return loss:

> 26dB at f_{SUBC}

3.6 Remote control

Type:

Parallel TTL-control by grounding

Functions which may be remote controlled:

- Int./Ext. sync selection
- Burst on/off
- Sc-H lock on/off
- Notch on/off
- Sync on/off

3.7 Electrical specification

3.7.1 Video performance

LUMINANCE CHANNEL

Matrix coefficients:

$E_y = 0.299 E_r + 0.587 E_g + 0.114 E_b$

Matrix inaccuracy:

< 1%

Frequency response:

+/-0.1dB, 15kHz to 6MHz

+0.1dB/-0.5dB to 8MHz

Above 8MHz smooth roll-off

Low frequency response:

<1% tilt on 50Hz squarewave

Pulse response:

2T pulse shape <0.5%K

2T pulse to bar ratio <1 %

Bar response <0.5%K

Random HF noise:

<-75dB_{RMS} weighted

(in 5MHz BW and with subc notch)

Hum and lower order harmonics:

<-60dB_{PP}

Spurious transients during active lines:

<-60dB_{PP} up to 10MHz

Spurious transients outside active lines:

<-40dB up to 10MHz

Non-linear distortions:

Differential gain : <0.2%

Differential phase : <0.15°

Line time non-lin. : <0.25%

Notch filter:

Attenuate min. 6dB at subc. frequency

CHROMINANCE CHANNEL

PAL versions all coded along U and V axes.

NTSC version coded along I and Q axes.

Matrix coefficients:

PAL:

$E_u = -0.147 E_r - 0.289 E_g + 0.437 E_b$

$E_v = 0.615 E_r - 0.515 E_g - 0.100 E_b$

NTSC:

$E_q = 0.211 E_r - 0.522 E_g + 0.311 E_b$

$E_i = 0.596 E_r - 0.274 E_g - 0.322 E_b$

Chrominance bandwidth:

PAL versions:

not more than 3dB down at 1.3MHz

not less than 20dB at subc freq.

NTSC version:

E_i : <3 dB at 1.3MHz

>20dB at 3.6MHz

E_q : <2dB at 0.4MHz

>6dB at 0.5MHz

>6dB at 0.6MHz

V-axis switching:

180° +/-0.5° (PAL-only)

Quadrature phase:

90° +/-1°

Coding accuracy:

Amplitude: within 0.25dB

Angle : within 1°

Residual subcarrier:

less than 2mV

Chroma noise:

<-60dB_{RMS} S/N amplitude

<-60dB_{RMS} S/N phase

TIMING

Time difference

Between the two chrominance components:

PAL : < 5nsec

NTSC : < 15nsec

Between luminance and chrominance:

PAL : <10nsec

NTSC : <20nsec

Insertion delay:

PAL : approx. 350nsec

NTSC : approx. 750nsec

3.7.2 Sync Pulse Generator

MODES OF OPERATION

Internal mode:

The Sync Pulse Generator is controlled by an internal oscillator which is locked to a reference oscillator.

External mode

1. The Sync Pulse Generator genlocks to an external composite video signal or black burst signal. Adjustable Line- and Subc- phase.
2. The Sync Pulse Generator locks to an external sync signal (no burst).

The subcarrier may be either:

- a. Free-running or
- b. Locked to the sync signal giving correct Line/- Subc phase (internal selectable).

This mode is especially useful when a component signal is converted to normal composite signal.

Mode of genlock:

Crash lock

SYNC LOCK

Horizontal freq. lock range:

+/-10ppm

Lock-in time:

< 1sec

Jitter with respect to input sync:
< 6nsec with noise-free signal of nom. ampl. and frequency

Jitter for 100% hum (max 1V_{PP}):
< 25nsec

Jitter with 28dB_{RMS} S/N:
< 10nsec

Line phase change:
< 15nsec for sync level nom. +/-6dB

Line phase adjustm.
+/-3usec via front panel potentiometer

SUBC LOCK

Lock range:
+/-25Hz of nominal

Lock-in time:
< 1sec

Jitter with respect to incoming burst phase:
< 1°

Subc. phase adjustment:
360° via front panel potentiometer

If burst is absent two modes are programmable (jumper):

- Subcarrier will either be free-running
 - Locked to line freq. with correct Sc-H phase
- Subc jitter : < 2°
Lock range : +/-5ppm

3.8 Mechanical dimensions

1U high, 19" rackmount/table-cabinet

Maximum dimensions:

Height : 44mm
Width : 483mm
Depth : 416mm
Weight : 5.0kg

3.9 Environmental conditions

The environmental data mentioned in this instruction manual is based on the results of the manufacturer's procedures.

Details of these procedures and failure criteria are supplied on request by the PHILIPS organization in your country, or by PHILIPS, INDUSTRIAL & ELEC-

TRO-ACOUSTIC DIVISION, EINDHOVEN, THE NETHERLANDS.

3.10 Climatic conditions

Ambient temperature:
+5°C to +45°C

Limit range for storage and transport:
-30°C to +70°C

3.11 Mechanical requirements

Vibration

Limit range for storage and transport:

30min. in each of three directions, 10 to 150Hz; 0.7mm p-p and 50m/s² max acceleration. According to IEC-Publ. 68, test Fc.

NOTE: Unit mounted on vibration table without shock absorbing material.

Bump

Limit range for storage and transport:

1000 bumps of 100m/s² sine, 6ms duration in each of 3 directions.

According to IEC-Publ. 68, test Eb.

Packaging

According to UN-D-1400

The test methods mentioned in the N.V. Philips Standard UN-D-1400 are in accordance with those of relevant ISO-Standards.

3.12 Mains supply conditions

Mains supply voltage:
100,120,220 or 240V AC, + 10%, -15%

Mains supply frequency:
48 - 65Hz

Power consumption:
25W (at nominal mains voltage)

PM 5638

Component color coder, SPG

6. Configuration

6.1 General

The PM 5638 is delivered in four different versions which are:

- G-PAL,
- N-PAL,
- M-PAL, and
- M-NTSC.

When the instrument is delivered it is set-up for the version ordered. Changing the instrument from one version to another requires component changes, altering of X-tal frequencies and other circuit modifications which are outside the scope of this manual.

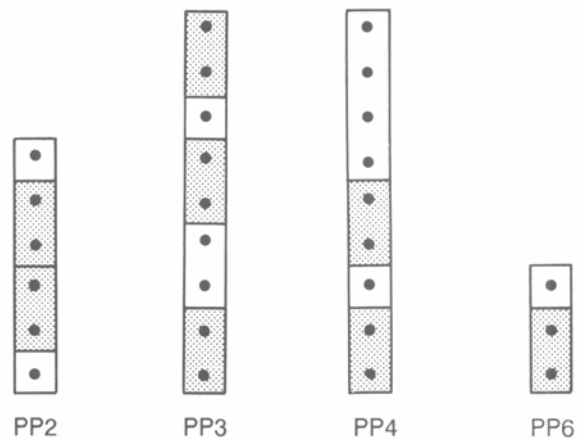
This chapter deals with the programming plugs which makes it possible to select e.g. different types of incoming signals, and options on the output signal. In addition the switches that determine the particular version are also shown, so that the correct location can be controlled if for some reason they have been disturbed.

Refer in all cases to fig. 6-1 which shows the location of all programming plugs.

6.2 Incoming signal selection

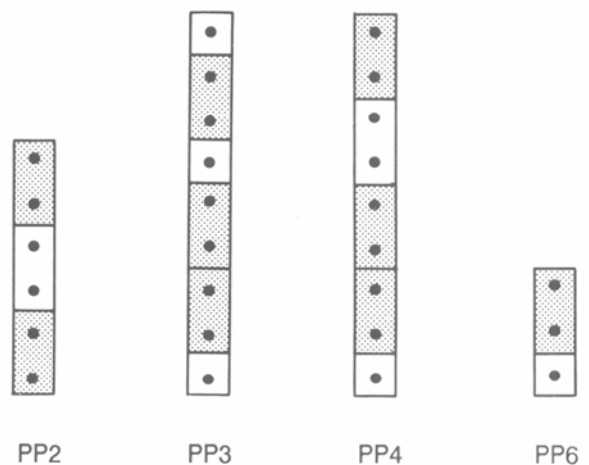
6.2.1 Input: Y, R-Y, B-Y - signals (PAL-versions)

To make the encoder convert Y, R-Y, B-Y - signals into a composite video signals the programming plugs PP2, PP3, PP4, and PP6 (all located on unit 4 - Encoder) must be located as follows:



6.2.2 Input: R, G, B signals (PAL-versions)

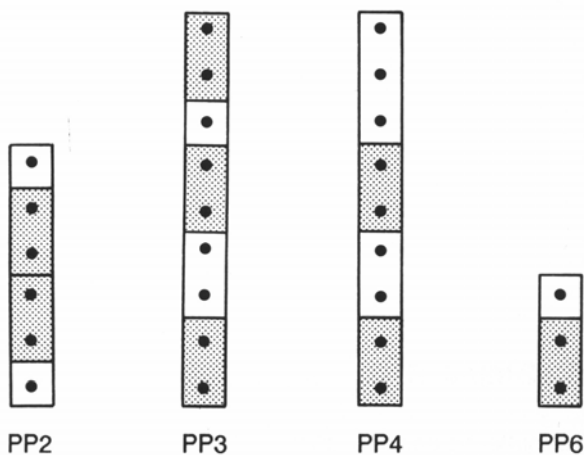
To make the encoder convert R, G, B signals into a composite video signals the programming plugs PP2, PP3, PP4, and PP6 (all located on unit 4 - Encoder) must be located as follows:



↑ Rear of the instrument

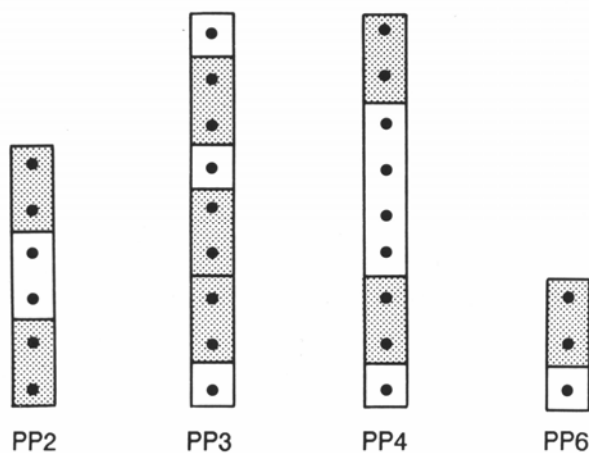
6.2.3 Input: Y, P_R, P_B - signals (NTSC-version)

To make the encoder convert Y, P_R, P_B signals into a composite video signals the programming plugs PP2, PP3, PP4, and PP6 (all located on unit 4 - Encoder) must be located as follows:



6.2.4 Input: R, G, B - signals (NTSC-version)

To make the encoder convert R, G, B signals into a composite video signals the programming plugs PP2, PP3, PP4, and PP6 (all located on unit 4 - Encoder) must be located as follows:



6.3 Output signals options

6.3.1 Sync on output signal

To provide the composite video output signal with sync the programming PP1 on unit 4 - Encoder should be located as follows:



6.3.2 Notch filter on/off

The notch filter on the encoder card can be switched ON or OFF depending on the setting of the programming plug PP7 on unit 4 - Encoder:



6.3.3 Burst on output signal.

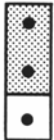
To provide the composite video output signal with burst the programming plug PP3 on unit 1 - Main board should be located as follows:



↑ Rear of the instrument

6.3.4 White bar line 7 field 1 option, composite video signal.

To insert the white bar in line 7 of field 1, the programming plug PP1 on unit 1 - Main board should be located as follows:



White bar ON



White bar OFF

6.3.5 White bar line 7 field 1 option, black burst signal.

To insert the white bar in line 7 of field 1, the programming plug PP1 on unit 5 - Black burst generator should be located as follows:



White bar ON



White bar OFF

6.3.6 Sc-H lock on/off

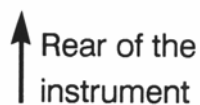
To lock the subcarrier to the line frequency, when external sync with no subcarrier is supplied, the programming plug PP2 on unit 1 - Main board should be located as follows:



Sc-H lock ON



Sc-H lock OFF



6.4 Version dependent configuration

This section shows the location of the programming plugs on unit 2 - Sync generator which MUST be located in the indicated position for correct operation of the version in use.

↑ Rear of the instrument

