

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 Electronic 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

PM 5644D/00	PAL-D/K, Philips-pattern.
PM 5644G/00	PAL-B/G, Philips-pattern.
PM 5644G/10	625 lines GBR, Philips-pattern.
PM 5644G/20	625 lines YC _B CR, Philips-pattern.
PM 5644G/50	PAL-B/G, FuBK-pattern.
PM 5644G/70	625 lines YC _B CR, FuBK-pattern.
PM 5644P/00	PAL-M, Philips-pattern.
PM 5644I/00	PAL-I, Philips-pattern.
PM 5644L/00	SECAM, Philips-pattern.
PM 5644M/00	NTSC-M, Philips-pattern.
PM 5644N/00	PAL-N, Philips-pattern.

3.3.1 Options

PM 8546G/00

Text and clock generator, 625-lines composite PAL versions.

PM 8546G/10

Text and clock generator, 625-lines component versions.

PM 8546M/00

Text and clock generator, 525-lines versions.

PM 8546L/00

Text and clock generator, SECAM version.

PM 9190

RS232 Remote Control Interface.

PM 9191

IEEE-488 Remote Control Interface.

3.4 Inputs

3.4.1 External sync input

The input signal for external synchronization may be either a black burst, a composite video signal or a mixed sync signal.

Connector:

2 x BNC.

Impedance:

75 Ω loop-through.

Return loss:

>40dB up to 7MHz.

Input level:

0.15V_{PP} to 4V_{PP} with up to 100% or 1V_{PP} hum.

In genlock mode the PM 5644 automatically switches to internal synchronization, if no input signal is available.

3.4.2 Time code/1Hz input (PM 8546)

Connector:

XLR female.

Impedance, LTC mode:

>10k Ω .

Impedance, 1Hz mode:

50 Ω .

Input level, LTC mode:

1 to 4V_{PP}.

Input level, 1Hz mode:

2 to 20V_{PP}

Duration of 1Hz pulse:

20 μ s to 0.5 s.

3.5 Outputs

3.5.1 Video outputs

COMPOSITE VERSIONS

Connector:

1 x BNC on front panel, 2 x BNC on rear panel.

Impedance:

75 Ω \pm 0.5%.

Return loss:

>36dB up to 5MHz.

Amplitude accuracy:

better than 1%.

COMPONENT VERSIONS

Connector:

3 x BNC on rear panel.

Impedance:

75 Ω \pm 0.5 %.

Return loss:

>36 dB up to 5 MHz.

Amplitude accuracy:

better than 1%.

Channel matching:

within \pm 0.5 %.

Delay difference between channels:

within 5ns referred to output G(Y).

3.5.2 Black burst output

There is no black burst output in the SECAM version (PM 5644L/00).

Connector:

BNC.

Impedance:

75 Ω \pm 1%.

Return loss:

>36dB up to 5MHz.

Residual subcarrier:

less than 3.5mV_{PP}.

Line to subcarrier phase:

Absolute phase : 0° \pm 10°.

Jitter : typical \pm 2°.

Drift : less than \pm 2° per 10°C.

Sync amplitude:

300mV \pm 2% (D, G, I, N and P versions)

286mV \pm 2% (M version).

Sync timing:

see SYNC OUTPUT.

Burst amplitude:

300mV \pm 3% (D, G, I, N and P versions)

286mV \pm 3% (M version).

Burst width:

2.25 μ s \pm 0.23 μ s (D, G, I and N versions)

2.5 μ s \pm 0.15 μ s (M and P versions).

Burst position:

5.6 μ s \pm 0.1 μ s (D, G, I and N versions)

5.3 μ s \pm 0.15 μ s (M version)

5.8 μ s \pm 0.1 μ s (P version)

Burst suppression:

lines 623-6, 310-318, 622-5 and 311-319

(D, G, I and N versions)

lines 1-9 and 264-272 (M version)

lines 522-7, 259-269, 523-8 and 260-270

(P version).

8-field reference, PAL versions:

line 7 field 1.

4-field reference, NTSC version:

line 11 field 1.

3.5.3 Sync output

Connector:

BNC.

Return loss:

30dB up to 4MHz.

Rise time:

200ns.

Amplitude:

4V \pm 0.4V or 2V \pm 0.2V (selectable).

Line sync duration:

4.7 μ s \pm 0.1 μ s.

Equalizing pulses:

2.4 μ s \pm 0.1 μ s.

Serration pulses:

4.7 μ s \pm 0.1 μ s.

3.5.4 Audio output

Connector:

XLR male.

Frequency:

1kHz \pm 0.1Hz.

Distortion:

less than 0.1% THD.

Level:

0dBm/600 Ω (0.775mV/600 Ω).

3.6 Remote control (PM 9190-91)

Control of the internal clock generator and text insertion is possible with a remote control option.

3.6.1 RS-232/V24 remote control

PM 9190 RS-232 Interface.

Connector:

25 pin male D-connector in compliance with RS-232-C (EIA) and V24 (CCITT) standards.

3.6.2 IEEE-488 remote control

PM 9191 GPIB Interface.

Connector 24 pin female AMPHENOL in compliance with the IEEE-488 standard. Connection to IEC-625 standard is possible by using IEEE to IEC adaptor PM 9483/50.

3.7 Test pattern specifications

AMPLITUDE ACCURACY:

Luminance:

\pm 1%.

Chrominance:

\pm 2 %.

Amplitude matching between channels:

\pm 0.5%. (component versions)

Frequency response:

\pm 1% up to 5MHz, \pm 2% up to 5.5MHz.

Delay matching between channels:

within 5ns referred to G/Y. (component versions)

Pulse-to-bar ratio:

1:1 within 1%.

Field tilt:

less than 0.5%.

Line tilt:

less than 0.5%.

Sync amplitude:

nominal within \pm 1%.

Sync front porch duration:

1.5 μ s \pm 0.1 μ s.

Luminance rise time:

200 ns \pm 10ns for 625-line versions.

250 ns \pm 10ns for 525-line versions.

Spurious signals:

below -55dB referred to 1V for frequencies up to 5.5MHz, below -50dB referred to 1V for frequencies from 5.5MHz and upwards.

3.8 Pattern composition, Philips pattern

3.8.1 Signals inside the circle

From top to bottom:

Black rectangle on white background.

Width of rectangle:

11.3 μ s.

Black/white and white/black transition with needle pulse in the white part.

Width of pulse:

225ns \pm 5% (D, G, I and L versions)

280ns \pm 5ns (M, N and P versions).

250kHz squarewave signal.

Amplitude:

75% of white (same amplitude as the GBR components of the 75% color bar).

Color bar (whithout white and black).

D, G, L and N versions:

EBU (100/0/75/0).

I version:

BBC (100/0/100/25).

M and P version:

NTSC (77/7.5/77/7.5).

Centre cross.

Width of vertical lines:

225ns \pm 5% (D, G, I and L versions)

280ns \pm 5ns (M, N and P versions).

Structure of the horizontal line:

2 lines, one per field, sequence reversed compared to the lines of the background cross-hatch.

Multiburst.

Frequencies:

0.8, 1.8, 2.8, 3.8, 4.8, 5.63 MHz (D version)

0.8, 1.8, 2.8, 3.8, 4.8 MHz (G versions)

1.5, 2.5, 3.5, 4.0, 4.5, 5.25 MHz (I version)

0.8, 1.8, 2.8, 1.8, 0.8 MHz (L version)

0.5, 1.0, 2.0, 3.0, 4.0 MHz (M, P and N versions).

Amplitude:

100% of white level (71.4% in I version)

5-riser staircase.

White/black and black/white transitions.

Color steps.

Yellow/red/yellow.

Circle.

Diameter:

88% of active picture height (625 line versions);

84% of active picture height (525 line versions).

3.8.2 Color signals outside the circle

The signals are described as vectors, chroma amplitude approx. 330mV (310mV in NTSC version).

The component versions of PM 5644 generates signals that will result in these vectors after coding.

From left to right:

Vertical bar with non-alternating R-Y signals (270°/270°) and B-Y = 0 ("Anti-PAL").

The signals are at some points starting at the extreme left of the picture for burst gate check.

2 vertical bars with R-Y signals (270° and 90°) and B-Y = 0.

2 rectangles with signal G-Y = 0 (326° and 146°).

2 rectangles with signal G-Y = 0 (326° and 146°).

2 vertical bars with B-Y signals (0° and 180°) and R-Y = 0.

Vertical bar with line-alternating B-Y signals (0°/180°) and R-Y = 0 ("Anti-PAL").

3.8.3 Background signals

Cross-hatch.

14 horizontal x 18 vertical lines.

Width of vertical lines:

225ns \pm 5% (D, G, I and L versions)

280ns \pm 5ns (M, N and P versions).

Background level:

48% of white (D, G, I, L and N version)

52% of white (M and P versions).

Black/white border castellations.**3.9 Pattern composition,
FuBK pattern****3.9.1 Signals in the middle area**

From top to bottom:

Color Bar (including white and black).

EBU (100/0/75/0).

4-riser staircase.**Center cross.****White/black and black/white transistions.****Rise time:**

200ns \pm 5ns.

Multiburst.

100% white reference, 1MHz, 2MHz, 3MHz,
4.43MHz (f_{subc} , G-Y = 0) and 50% white.

Amplitude:

100% of white level.

White bar with black triangle.**Max duration of pulse:**

1 μ s.

Rise time of pulse:

200ns \pm 5ns.

 f_{SUBC} sawtooth.

\pm (R-Y) starting with 75% of white amplitude
(5.4 μ s), then descending to 0% amplitude (16.2 μ s).
+(B-Y) starting with 75% of white amplitude
(5.4 μ s), then descending to 0% amplitude (16.2 μ s).

Anti-PAL signals.

Non-alternating R-Y signals and line-alternating
B-Y signals.

Amplitude:

75% of white level.

Circle.**Diameter:**

93% of active picture height.

3.9.2 Signals outside the middle area**Cross-hatch.**

15 horizontal x 19 vertical lines.

Width of vertical lines:

200ns \pm 5%.

Background level:

25% of white.

3.10 Text insertion (PM 8546)**3.10.1 Station identification**

One or two lines of text may be inserted into the picture.

Text font:

Helvetica condensed (proportional).

Number of letters (Philips pattern):

approx. 9 capital letters (upper text field)

approx. 13 capital letters (lower text field).

More characters may be used depending on the type of text - contact Philips for more information.

3.10.2 Clock and calendar

Date and time can be inserted in the picture.

Text font:

Helvetica condensed (fixed spacing).

Date format:

DD-MM-YY, MM-DD-YY or YY-MM-DD.

Time format:

HH:MM:SS.

Stability:

When the instrument is "ON", the clock circuits are locked to the sync pulses of the video signal.

When the instrument is "OFF", the clock circuits are locked to an internal X-tal.

The clock can also be locked to a studio clock (EBU/SMPTE time code or 1Hz synchronizing signal).

3.11 Logo (optional)

A multi colored, high resolution station logo can be inserted in the picture with option PM 8546.

Contact Philips for more information of the design of the logo.

3.12 Synchronization

Following modes for external synchronization are available:

- locking to a black burst or composite video signal.
- locking to a sync signal

Internal selection between subcarrier free running and subcarrier locked to line giving correct line-to-subcarrier phase.

3.12.1 Internal mode

Subcarrier frequency:

4,433,618.75Hz (D, G, and I versions).

4,406,250/4,250,000Hz $\pm 2,000$ Hz (L versions).

3,579,545Hz (M version).

3,575,611.49Hz (P version).

3,582,056.25Hz (N version).

Color subcarrier temperature stability:

0-50°C : better than 1ppm
(ref. 25°C).

Ageing : less than 0.1ppm
per month.

Stability Sc-H:

Jitter : less than $\pm 2^\circ$.

Drift : less than $\pm 2^\circ$ per 10°C.

Absolute phase : $0^\circ \pm 15^\circ$ line 1 field 1.

3.12.2 External mode

SLOW LOCK:

Requirements as described under EXTERNAL SYNC INPUT.

SYNC LOCK:

Horizontal frequency lock range:

± 1 ppm.

Lock-in time (vertical):

less than 7s .

Jitter with respect to input sync:

less than 6ns for noise free signal of nominal amplitude and frequency.

Jitter for 100% hum (max. 1V_{PP}):

less than 25ns.

Jitter for 28dB_{RMS} signal-to-noise:

less than 10ns.

Line phase change for sync level nominal ± 6 dB:

less than 15ns.

Line phase adjustment:

$\pm 3\mu$ s via front panel potentiometer.

SUBCARRIER LOCK:

Lock range:

± 25 Hz of nominal.

Lock-in time:

less than 1s.

Jitter with respect to incoming burst phase:

less than 1° .

Subcarrier phase adjustment:

more than 360° via front panel potentiometer.

In case no burst is available two lock modes are internally selectable by jumper setting.

–free-running subcarrier

–subcarrier is locked to line frequency with correct

Sc-H phase:

Subcarrier jitter : less than 2° .

Lock range : ± 5 ppm.

3.13 Environmental conditions

The environmental data mentioned in this instruction manual is based on the results of the manufactures procedures. Details of these procedures and failure criteria are supplied on request by the Philips organization in your country, or by PHILIPS, INDUSTRIAL & ELECTRO-ACOUSTIC DIVISION, EINDHOVEN, THE NETHERLANDS.

3.13.1 Temperature range

Operating range:

+5°C to +45°C (+141°F to +113°F)

Functioning temperature:

0°C to +55°C (+32°F to 131°F)

Storage and transport:

-40°C to +70°C (-40°F to +158°F)

3.13.2 Mechanical test conditions

VIBRATION

Limit range for storage and transport:

30min. in each of three directions, 10 to 150Hz;

0.7mmpp 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.

3.14 Mains supply conditions

Electrical safety:

according to IEC 348.

Mains supply voltage:

100, 120, 220 or 240V AC (max. 250V), +10%/-15%.

Mains supply frequency:

48-65Hz.

Power consumption:

25W.

3.15 Mechanical data

19" table/rack mount cabinet.

Height	:	44mm	(1.73").
Width	:	483mm	(19").
Depth	:	461mm	(18.14").
Weight	:	6.5kg	(14.32lbs).