PM5632 Colour generator, SECAM

The PM5632 is a combined high-quality sync generator and flexible video generator for SECAM systems.
It is ideal for use in TV-set manufacturing applications, both for central transmitter installation and for individual unit testing.
In addition, it may be used for service and repair in broadcast and CATV applications as well as larger CCTV installations.

Remote control of the instrument (including pattern composition) is also possible via the optional IEEE Bus interface (PM8520).

Two video outputs are provided, one on the front panel and one on the rear. The outputs are identical and consist of one selected signal or pattern from a library of colour and monochrome signals which are stored in PROMS.
If a particular test requires a sequence of patterns, up to nine patterns from the library may be stored in the required sequence by use of the PRESELECTOR function.

Six sync signals are available simultaneously on the rear panel.
These are:

- Blanking
- Sync
- Chroma blank
- FØR/FØB
- F_h/F_v
- SECAM ID

Technical data

Safety characteristics

This apparatus has been designed and tested in accordance with Safety Class 1 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 by the user to ensure safe operation and to retain the apparatus in a safe condition.

Performance characteristics

Properties expressed in numerical values with stated tolerances are guaranteed by N.V. Philips Gloeilampenfabrieken. Specified numerical values without tolerances indicate those that could be nominally expected from the mean of a range of identical instruments.

A. Initial characteristics

- 1u high, 19" rackmount/table-cabinet
- Maximum dimensions
  Height : 44mm
  Width : 482mm
  Depth : 460mm
- Maximum weight (mass) : 5.2kg

ENVIRONMENTAL CONDITIONS

The environmental data mentioned in this instruction manual is based on the results of the manufacturer`s checking procedures.
Details of these procedures and failure criteria are supplied on request by the PHILIPS organisation in your country, or by N.V. PHILIPS GLOEILAMPENFABRIEKEN, SCIENTIFIC & INDUSTRIAL EQUIPMENT DIVISION, EINDHOVEN, THE NETHERLANDS.

B. Climatic conditions

- Ambient temperature : +5^{0}C to +45^{0}C
  Limit range for : -30^{0}C to +70^{0}C
  Storage and transport

C. Mechanical requirements

- Vibration		
Limit range for storage and transport	: 30min. in each of three directions, 10 to 150Hz; 0.7mm P-P and 50m/s^2 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/s^2 sine, 6ms duration in each of 3 directions.	: According to IEC Publ. 68, test Eb.
- Packaging	: acc. to UN-D-1400	

D. Mains supply voltage

Mains supply voltage	: 100,120,220 or 240V AC,
Rated range of use	+10%, -15%
Frequency	: 48-65Hz
Consumption	: 35W at 220V

E. General operating conditions

625 lines, 50Hz field frequency

SECAM system III B

CONNECTORS AND CONTROLS

Video outputs:

Video output	(Front 1xBNC)
Video output	(Rear 1xBNC)

Synchr. outputs (rear panel):

Sync	(1xBNC)
Blanking	(1xBNC)
Chroma blank	(1xBNC)
FOR/FOB	(1xBNC)
SECAM ID	(1xBNC)
F_h/F_v out	(1xBNC)

Synchr. input (rear panel): (2xBNC looped-through) composite video signal (black burst) or composite sync (gives only BL/WH gen-lock).

FRONT PANEL FUNCTIONS

Power ON/OFF
Line phase
Ext/int synchronization
Vertical ident
Pattern no. select (2 buttons)
Preselector (2 buttons)
Local/remote (1 button)
Display of a) preselected pattern no.
b) library pattern no.
VI ON (1 button)
SY OFF (1 button)
CHROM OFF (1 button)
Y OFF (1 button)
DB OFF (1 button)
DR OFF (1 button)

INDICATORS

Power ON
Sync ref. available

REAR PANEL FUNCTIONS

Besides the video signal connectors there are:
Mains input combined with mains voltage selection and fuse.
Terminal for electrical ground.
Terminal for safety earth.

F. Video outputs

Up to 99 different patterns can be stored and are all addressable from the front panel.
9 different patterns can be transferred to the preselector function.
In addition, all functions, patterns and the line library are accessible via an optional IEEE bus interface (PM8520).

PATTERN ORGANISATION

Horizontal resolution	: 200ns
Vertical resolution	: max. 255 diff. lines in a field Field 1 the same as field 2

G. Electrical specification

LUMINANCE ACCURACY

White level	: 700mV ±0.75%
Other luminance levels	: within 2.6mV (0.75LSB) of correct value relative to the calibrated 700mV level.
Sync amplitude	: 300mV ±2%

CHROMINANCE SUBCARRIER:

F_r	: 4.406250MHz ±2kHz
F_b	: 4.250000MHz ±2kHz

D_r and D_b digitally defined:

Quantizing level	: 4.00641kHz
Modulation tolerance	: 4kHz ±1.25% of deviation
Clipping frequencies	: 4756.25 ±12kHz
	: 3900.00 ±12kHz

Amplitudes (line burst):

D_b	: 166 ±15mV
D_r	: 215 ±15mV

Other amplitudes determined by Bell filter tolerance.

Center frequency	: 4.286 ±20kHz
Response	: ±0.5dB from nominal

Suppression of subcarrier >46dB.

Luminance rise and fall time	: 165ns ±15ns
Sync rise and fall time	: 230ns ±20ns

Phase relations (in gen-lock mode)
Colour sequence follows input signal

Line jitter	: <10ns

TIMING

Sync width	: 4.7 ±0.2us
Burst start	: 5.6 ±0.1us
Burst width	: 2.25 ±0.23us
Front porch	: 1.5 ±0.2us
Line blanking	: 12.0 ±0.3us
Return loss up to 7MHz	: >36dB

H. Sync pulse generator

MODES OF OPERATION

1. INTERNAL MODE

The sync pulse generator is controlled by an internal X-tal oscillator which is locked to a reference oscillator.

2. EXTERNAL MODE

The sync pulse generator genlocks to an external video or composite sync. The line and field frequency phase locks to the external source and, if a line burst is present, the colour sequence is locked to the incoming sequence.

3. MODE OF GENLOCKING

Slow lock.

COLOUR SUBCARRIER

Frequencies	: 4406.25 ±2kHz 4250.00 ±2kHz
Temperature stability:	
0.5^{0}C (ref. 25^{0}C)	: <1x10-6
25-35^{0}C	: <3x10-7 (typical)
Ageing	: <1x10-7 per month

Stability line/subc:

Subc is always locked to the line freq.	: 272xF_h and 282xF_h
Subc reset sequence	: 0,0,180,0,0,180

COMPOSITE SYNC

Line sync pulses	: 4.7 ±0.2us
Front porch	: 1.5 ±0.2us
Equalizing pulses	: 2.35 ±0.15us
Serration pulses	: 4.7 ±0.2us
Number of serration pulses	: 5
Number of equalizing pulses	: 5+5

COMPOSITE BLANKING

Line blanking duration	: 12.0 ±0.3us
Field blanking duration	: 25H+12us

CHROMA BLANK

Line blanking duration	: 7.2us ±0.2us
Vertical blanking duration	: 25H +7.2us, except lines 7-15 and 320-328
SECAM ID	: FH/2 square wave. Positive during lines with D_r

Sync Genlocking (slow lock)

Input requirements:
Synchronization signal either

a. composite video,
b. black burst or
c. composite sync

Amplitude	: 0.5-4Vpp max. 100% or 1Vpp hum.

SYNC LOCK

Horizontal frequency lock range	: ±10ppm
Lock-in time (vertical)	: <7sec
Jitter with respect to input sync	: <10ns for noise-free signal of nom. frequency and amplitude
Jitter for 100% HUM (max. 1Vpp)	: <25ns
Line phase change	: <15ns for sync level 300mV ±6dB
Line phase adjustment	: ±3us via front panel potentiometer

SUBCARRIER LOCKING

D_r/D_b lock-up level	: ±6dB
D_r+D_b drop-out level	: -12dB
Lock-in time	: <1sec

J. Inputs

SYNCHRONIZATION INPUT

The following inputs may be applied:
a. composite video
b. black burst
c. composite sync

Amplitude	: 0.5-4Vpp and max. 100% or 1Vpp hum.
Impedance	: high ohmic, looped-through
Return loss	: >40dB up to 7MHz

K. Synchronizing signals

PULSE OUTPUTS

a. sync
b. blanking
c. chroma blanking
d. SECAM ID
e. F_h or F_v (internally selectable).

ELECTRICAL SPECIFICATION

Amplitude	: 4.0 ±0.4Vpp into 75ohms
Rise and fall time	: 200ns
Return loss	: >26dB up to 4MHz

Subc output

Subc output (internally selectable D_r, D_b or sequence).

Amplitude	: 1Vpp into 75ohms

ENVIRONMENTAL CONDITIONS

Temperature range:

Operating	: 5^0-45^0C
Storage	: -30^0-70^0C
Climatic	: C1
Mechanical	: M1
Supply	: S2

Safety and EMC

Class I instrument according to IEC 348.

Electromagnetic interference: VDE 0871/DIN 57871, Class B and FCC limit A.

Pattern library

STANDARD-ROUTINE SIGNALS:

PATTERN 1: Black, FF
- 2: EBU colour bar, FF
- 3: EBU + grey, 2:1
- 4: EBU + red, 2:1
- 5: Monitor test
- 6: Pluge with grey-scale, FF
- 7: Red 75%, FF
- 8: Cross-hatch 14 19 + overscan.
- 9: Flat-field window 5%
- 10: Flat-field window 100%

If not defined by user (IEEE Option only)

COLOUR SIGNALS:

PATTERN 11: Colour bar 100%, FF
- 12: Colour bar 75%, FF
- 13: EBU colour bar, FF
- 14: Colour bar 25%, FF
- 15: EBU + Red, 2:1
- 16: EBU + Blue, 2:1
- 17: EBU + Grey, 2:1
- 18: EBU + Black/White 75%, 2:1
- 19: CB 25%+CB 75%+BL/WH(75%), 1:1:1
- 20: EBU + luminance, 2:1
- 21: EBU + reverse EBU, 1:1
- 22: EBU + WH/PLUGE, 2:1
- 23: Monitor test
- 24: EBU vertical
- 25: Red-75%, FF
- 26: Green-75%, FF
- 27: Blue-75%, FF
- 28: Yellow-75%, FF
- 29: Cyan-75%, FF
- 30: Magenta-75%, FF
- 31: Yellow/Red/Yellow-75%, FF
- 32: "R-Y=0"/"B-Y=0"-Pattern-75%, FF
- 33: "R-Y=0"/B-Y=0"/"G-Y=0"pattern-75%, FF

COLOUR SIGNALS:

PATTERN 34: Black/White/Green-pattern, FF
- 35: Receiver pattern
- 36: White/Red/White/Red/White, FF
- 37: Black, FF.
- 38: - .
- 39: - .
- 40: - .

BLACK/WHITE SIGNALS:

PATTERN 41: Cross-hatch 14 19
- 42: Cross-hatch 14 19 + dots
- 43: Dot pattern
- 44: Cross-hatch 14 19 + overscan
- 45: Cross-hatch 14 19 + border cast.
- 46: Cross-hatch + Dots, 14 19 negative
- 47: Pluge with greyscale
- 48: Black-Pluge, FF
- 49: Pluge+White (50% of screen), FF
- 50: Black, FF
- 51: Flat-field window 5%
- 52: Flat-field window 10%
- 53: Flat-field window 15%
- 54: Flat-field window 20%
- 55: Flat-field window 30%
- 56: Flat-field window 40%
- 57: Flat-field window 50%
- 58: Flat-field window 60%
- 59: Flat-field window 70%
- 60: Flat-field window 80%

BLACK/WHITE SIGNALS:

PATTERN 61: Flat-field window 85%
- 62: Flat-field window 90%
- 63: Flat-field window 95%
- 64: Flat-field window 100%
- 65: EHT (with grid) 10%
- 66: EHT (with grid) 30%
- 67: EHT (with grid) 50%
- 68: EHT (with grid) 70%
- 69: EHT (with grid) 90%
- 70: 50Hz square-wave, POS
- 71: 50Hz square-wave, NEG
- 72: 15.625Hz square-wave, POS
- 73: 15.625Hz square-wave, NEG
- 74: 250kHz square-wave
- 75: Checkerboard
- 76: Reflexion-signal 1:1
- 77: Sawtooth
- 78: Grey-scale, 10 steps pos.
- 79: Grey-scale, 5 steps pos.
- 80: Grey-scale, 10 steps neg.
- 81: Grey-scale, 5 steps neg.
- 82: Chroma-sweep
- 83: Vertical staircase (CISPR)

Line library

COLOUR-LINES:

1: Black
2: Vertical ID
3: Yellow, 75%
4: Cyan, -.
5: Green, -.
6: Magenta, -.
7: Red, -.
8: Blue, -.
9: "B-Y=0", 75%
10: "R-Y=0", -.
11: "G-Y=0", -.
12: "R-Y=0/B-Y=0", -.
13: "R-Y=0/B-Y=0/G-Y=0", -.
14: Green/Red/Blue, -.
15: Yellow/Red/Yellow, -.
16: White/Red/White/Red/White -.
17: Black/White/Green
18: White/Black/Green

COLOURBAR-LINES:

19: Standard, 100%
20: Standard, 75%
21: Standard, 25%
22: EBU
23: Reverse std., 100%
24: Reverse EBU

BLACK/WHITE-LINES:

25: White-line, 50%
26: White-line, 75%
27: White-line, 100%
28: Square-wave, 15.625Hz BL/WH 75%
29: Square-wave, 15.625Hz WH/WH 100%
30: Square-wave, 15.625Hz BL/WH 100%
31: Square-wave, 156.25kHz WH/BL/WH..,-.
32: Square-wave, 156.25kHz BL/WH/BL..,-.
33: Square-wave, 250kHz
34: 2T pulse
35: 2T pulse inverted

FLAT-FIELD-LINES:

36: Flat-field, 5%
37: Flat-field, 10%
38: Flat-field, 15%
39: Flat-field, 20%
40: Flat-field, 30%
41: Flat-field, 40%
42: Flat-field, 50%
43: Flat-field, 60%
44: Flat-field, 70%
45: Flat-field, 80%
46: Flat-field, 85%
47: Flat-field, 90%
48: Flat-field, 95%
49: Flat-field, 100%

GREYSCALE-LINES:

50: 5-riser, positive
51: 5-riser, negative
52: 10-riser, positive
53: 10-riser, negative
54: EBU-colourbar-luminance

PLUGE-LINES:

55: Pluge-ref.-line
56: Pluge without grey-scale
57: Pluge with grey-scale, 112mV Level
58: Pluge with grey-scale, 210mV Level
59: Pluge with grey-scale, 448mV Level
60: Pluge with grey-scale, 700mV Level
61: Pluge+white (50% of screen)
62: White+Pluge (50% of screen)

SAWTOOTH-LINES:

63: Sawtooth

CHROMA-LINES:

64: Chroma Sweep

CISPR-LINES:

65: CISPR-Line, 1/9 white
66: CISPR-Line, 2/9 white
67: CISPR-Line, 3/9 white
68: CISPR-Line, 4/9 white
69: CISPR-Line, 5/9 white
70: CISPR-Line, 6/9 white
71: CISPR-Line, 7/9 white
72: CISPR-Line, 8/9 white

CROSSHATCH-LINES:

73: 14 19 Grid-line
74: 14 19 Dot-line
75: 14 19 Grid & Dot-line
76: 14 19 Overscan H line
77: 14 19 Overscan V line
78: 14 19 Border cast.(top/Bot.) line
79: 14 19 Border cast line
80: 14 19 Neg. grid-line
81: 14 19 neg. grid&dot-line

EHT-LINES:

82: EHT with grid, 10%
83: EHT with grid, 30%
84: EHT with grid, 50%
85: EHT with grid, 70%
86: EHT with grid, 90%