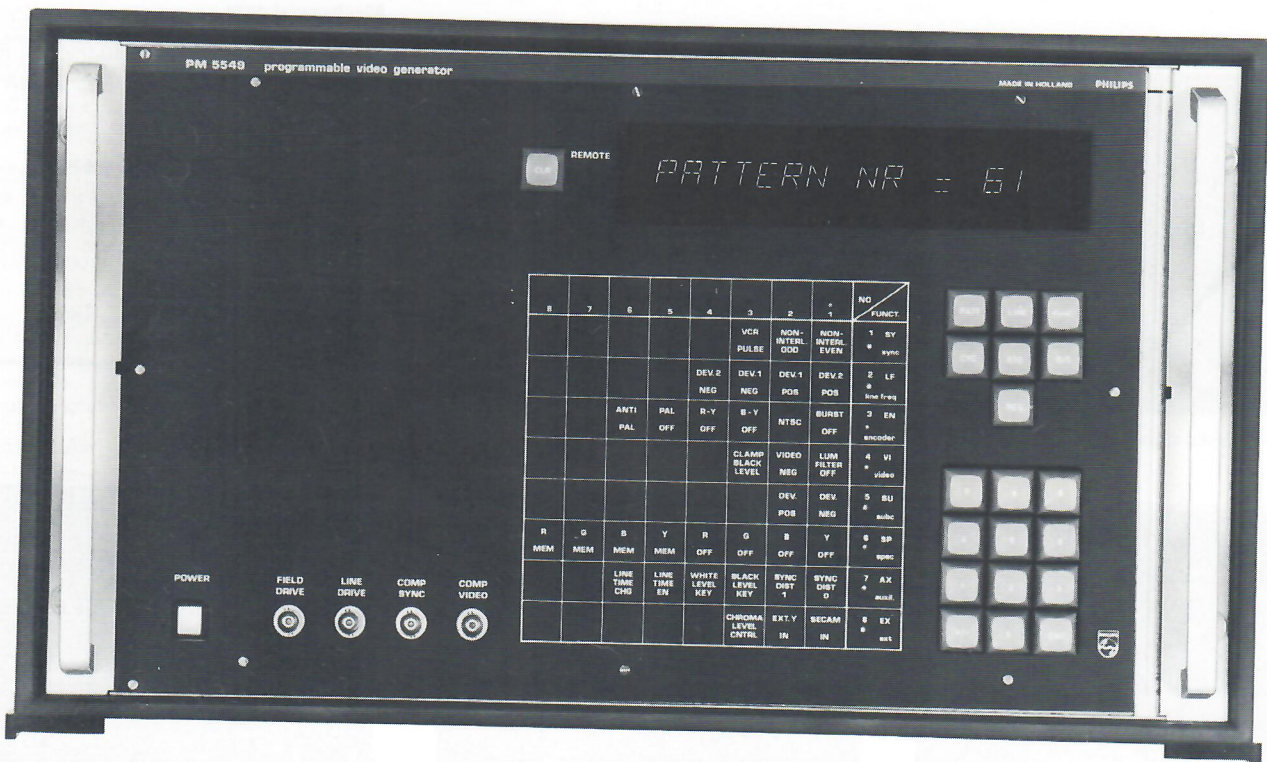


Code no. PM 5549:  
9449 055 49003 (G-version, 625-lines PAL)



## Worlds most flexible video generator

Can be controlled manually as well as via IEC bus

All basic signals are stored in programmable read-only memories (PROMS)

The PM 5549 Programmable video generator is an extremely versatile video test signal and video pattern generator, designed for manual as well as computerized test systems (IEC bus).

The generator is working in accordance with the digital principle, where the waveforms are stored in programmable read-only memories (PROM's). The analog signals are produced in digital-to-analog converters, which "translates" the digital waveforms into analog ones. The digital principle has two advantages over the usual analog principle: first it has more

The test signals can be processed in a multitude of different ways

Ideal for computerized measuring system

Composite patterns can be composed from the basic signals

flexibility, because any change or modification of a signal is done by change of the content of the PROM's, and secondly digital generators are more accurate and more stable than analog ones.

## Programming

The PM 5549 is programmable in two "dimensions". As mentioned before the various test signals and patterns are stored in PROM's. The PM 5549 is delivered with a standard "library" of the most commonly used test signals, but the user can change or comple-

Off-set frequencies for colour subcarrier and horizontal line are available

The PM 5549 comprises a complete measuring station for research, engineering, quality control and final inspection of all sorts of video and television equipment

ment the standard library with his own test signals (first dimension programming). Furthermore the instrument can be programmed to form complex patterns of the available test signals, or form sequences of stored patterns, - or the stored signals can be modified by use of the so-called function facility (second dimension). Obviously, programming of the first dimension requires programming skills and access to PROM programming equipment (or PROM's can be ordered from the factory), while programming of the second dimension is done by the operator himself or via a computer.





**Video generator**

The PM 5549 has a built-in sync pulse generator with facilities for off-set of the colour subcarrier frequency and the horizontal line frequency (test of phase lock stability and pull-in capability).

Fundamentally the signals are generated on Y-R-G-B basis. The signals are available at the rear of instrument. Via the built-in PAL encoder also PAL signals are available. SECAM signals can be generated via an external SECAM encoder.

**TECHNICAL DATA**

**Test signals**

**SQUARE WAVE SIGNALS** — 1: 15 625 Hz, bl/wh. 2: 15 625 Hz, wh/bl. 3: 250 kHz. 4: 100 kHz.

**FLAT FIELD SIGNALS** — 5: 0%. 6: 5%. 7: 10%. 8: 15%. 9: 20%. 10: 25%. 11: 30%. 12: 35%. 13: 40%. 14: 45%. 15: 50%. 16: 55%. 17: 60%. 18: 65%. 19: 70%. 20: 75%. 21: 80%. 22: 85%. 23: 90%. 24: 95%. 25: 100%.

**GREY SCALE SIGNALS** — 26: 5 riser positive. 27: 5 riser negative. 28: 10 riser positive. 29: 10 riser negative.

**PURITY SIGNALS** — 30: Red, 100%. 31: Red, 75%. 32: Green, 100%. 33: Green, 75%. 34: Blue, 100%. 35: Blue, 75%.

**COLOUR DIFF. SIGNALS** — 36: R-Y, 100%. 37: R-Y, 75%. 38: B-Y, 100%. 39: B-Y, 75%. 40: G-Y, 100%. 41: G-Y, 75%. 42: B-Y/R-Y, 100%. 43: B-Y/R-Y, 75%. 44: B-Y/R-Y/G-Y, 100%. 45: B-Y/R-Y/G-Y, 75%.

**COLOUR TRANSIENTS** — 46: Yellow/red/yellow, 100%. 47: Yellow/red/yellow, 75%. 48: Green/red/blue, 100%. 49: Green/red/blue, 75%.

**COLOUR BAR SIGNALS** — 50: Standard 100%. 51: Standard, 75%. 52: BBC. 53: Reverse, 100%. 54: Reverse, 75%. 55: Reverse BBC. 56: Minimum phase shift. 57: Maximum phase shift.

**PULSE-AND-BAR SIGNALS** — 58: 2T pulse. 59: Inverted 2T pulse. 60: 2T pulse and bar.

**PLUGE SIGNALS** — 61: PLUGE + black. 62: PLUGE + white (10% of screen). 63:

A specific signal is called by pressing either the pattern button followed by a two digit number (PATT XX), or by pressing the line button and a four digit number (LINE XXXX). "Lines" are defined as signals without field information (same signal in all active lines), while "patterns" have vertical information.

The storage capacity is sufficient for up to several hundred signals and patterns. The exact number of signals that can be stored, depends however on the complexity of the signals.

**Functions**

All video signals can be modified by means of the function facility. By pressing the "FUNC" button followed by a 2-digit number the function indicated in the matrix is activated. Several functions can be active simultaneously, however only the latest entered function is indicated by the LED indicators of the matrix.

PLUGE + 20% white. 64: PLUGE + 30% white. 65: PLUGE+40% white. 66: PLUGE + 50% white.

**GREY SCALE WITH CHROMA** — 67: Grey scale, 5 riser + chroma. 68: Grey scale, 5 riser inverse + chroma. 69: Grey scale, 10 riser + chroma. 70: Grey scale, 10 riser inverse + chroma.

**CHROMA SIGNALS** — 71: Chroma staircase. 72: White + chroma.

**COMPOSITE SIGNALS** — 73: EBU line 330 VIT signal. 74: EBU line 331 VIT signal. 75: EBU line 17 VIT signal.

**SAWTOOTH SIGNALS** — 76: 100 step grey scale (RGB). 77: 100 step grey scale (Y).

**Patterns**

**SQUARE WAVES** — 1: 50 Hz, bl/wh. 2: 50 Hz, wh/bl.

**CHECKER BOARD** — 3: 6 x 8 squares.

**HIGH VOLTAGE SIGNALS (EHT)** — 4: EHT 10%. 5: EHT 30%. 6: EHT 50%. 7: EHT 70%. 8: EHT 90% of white screen.

**PULSE-AND-BAR SIGNAL** — 9: 2T + window.

**COLOUR DIFFERENCE PATTERNS** — 10: R-Y/B-Y, 100%. 11: R-Y/B-Y, 75%. 12: R-Y/B-Y/G-Y, 100%. 13: R-Y/B-Y/G-Y, 75%.

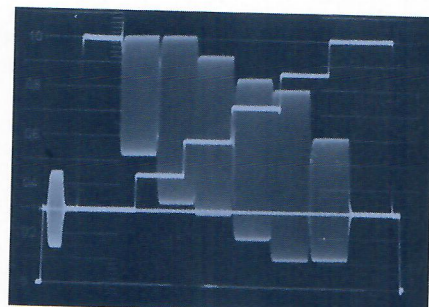
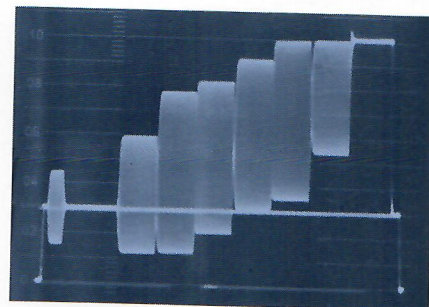
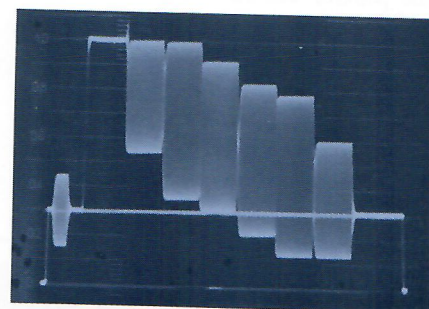
**COLOUR BAR SIGNALS** — 14: EBU colour bar. 15: 100% colour bar. 16: BBC colour bar. 17: EBU colour bar + reverse. 18: EBU colour bar + R/G/B. 19: EBU colour bar + R-Y/B-Y. 20: EBU colour bar + grey scale. 21: EBU colour bar + PLUGE. 22: EBU colour bar + red.

**Cycles**

By using the cycle function, complex patterns can be generated from all the available line signals. The operator only has to indicate the type of signals he wants and for how many lines of the field, he wants them generated. When cycles of patterns are made, each pattern will be generated for a period of time, in accordance with the operators instructions.

**Computer interface**

The PM 5549 has an IEC bus interface. All functions that are programmable from the front, can also be "called" via the IEC bus input. The PM 5549 is therefore ideal for insertion in computerized or automated test procedures or sequences have to be followed.



Above: EBU colour bar, EBU colour bar reverse sequence, EBU colour bar + 5 riser grey scale.



# PM 5549

**CONVERGENCE PATTERNS** — 23: Cross-hatch 14 x 19. 24: Cross-hatch 14 x 19 dots. 25: Cross-hatch 14 x 19 + overscan marks. 26: Cross-hatch 14 x 19 + border castellations. 27: Dot pattern.

**MONOCHROME PATTERNS** — 28: Flat-field signal, 0% (black). 29: Flat-field signal, 50%. 30: Flat-field signal, 100%. 31: 15.625 kHz squarewave, bl/wh. 32: 15.625 kHz squarewave, wh/bl. 33: 250 kHz, 100%. 34: Sawtooth. 35: Grey scale 5 riser. 36: Grey scale 10 riser. 37: PLUGE + black. 38: PLUGE + 50% white. 39: Pulse-and-bar. 40: 2T pulse. 41: Line 17. 42: Line 330. 43: Line 331.

**COLOUR PATTERNS** — 44: Grey scale 5 riser + chroma. 45: Grey scale 10 riser + chroma. 46: Chroma staircase. 47: White + chroma. 48: Red, 100%. 49: Red, 75%. 50: Green, 100%. 51: Green, 75%. 52: Blue, 100%. 53: Blue, 75%. 54: R-Y, 100%. 55: R-Y, 75%. 56: G-Y, 100%. 57: R-Y, 75%. 58: B-Y, 75%. 59: G-Y, 75%. 60: Yellow/red/yellow, 100%. 61: Yellow/red/yellow, 75%.

## Functions

By means of the function facility of PM 5549 all the aforementioned test signals and patterns can be changed or modified as follows.

**SYNC FUNCTIONS** — 1.1: Non-interlaced even, 624-lines system, even fields. 1.2: Non-interlaced odd, 624 lines system, odd fields. 1.3: VCR-pulse: spec. identification pulse in vertical interval. 2.1: Dev. 2 pos: the horizontal line frequency is offset by + 8%. 2.2: Dev. 1 pos: the line frequency is offset by + 4%. 2.3: Dev. 1 neg: the LF is offset by - 4%. 2.4: Dev. 2 neg: the LF is offset by - 8%. 5.1: Dev. neg: the colour subcarrier is offset by - 300 Hz. 5.2: Dev. pos: the colour subcarrier is offset by + 300 Hz.

Note. The above mentioned line- and sub-carrier frequencies are crystal controlled. Other deviations can be realized by change of crystals.

**COLOUR FUNCTIONS** — 3.1: Burst off. 3.2: NTSC. 3.3: B-Y off. 3.4: R-Y off. 3.5: PAL off: active line NTSC, colour burst still PAL. 3.6: Anti PAL: B-Y is alternated, R-Y is non-alternated. 6.1: Y off: luminance of composite signal is switched off. 6.2: B off. 6.3: G off. 6.4: R off. 6.5-6.8: MEM functions: allow the operator to generate a flat field signal (monochrome or coloured) by selecting a specific address in the test line PROM.

**VIDEO FUNCTIONS** — 4.1: Lum filter off: the 200 ns low-pass filter after the D/A converter is switched off. 4.2: Video neg: inverted video. 4.3: Clamp black level: clamping at black level instead of normally sync tip level.

**AUXILIARY FUNCTIONS** — 7.1: Sync dist 0: a logic signal applied to the "LTC pulse" input will force the output signal to sync peak level. 7.2: Sync dist 1: a logic signal at same input will force the sync pulse level up to black level. 7.3: Black level key: a logic signal at same input will force the test signal to black.

7.4: White level key: a logic signal at same input will force the test signal to white level. 7.5: Line time enable, enables function 7.6. 7.6: Line time chg: the line time (normally 64  $\mu$ sec) is changed + or - a number microseconds during the time (of the field), where a logic signal is applied to the "LTC pulse" input.

## Signal selection and programming

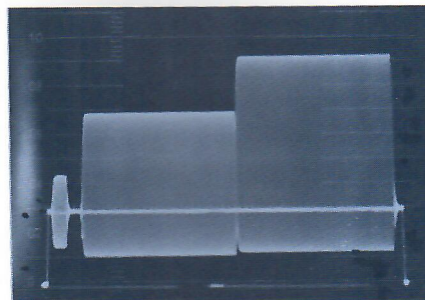
The PM 5549 can be operated via the front panel push-buttons or via the IEC bus interface. The following typical cases are:

1. Selection of a LINE signal from the line signal library (all lines of the field are identical).
2. Selection of a PATTERN from the pattern library (several line signals are generated during the field).
3. Programming of a composite pattern from the line signal library (CYCLE).
4. Programming of a time sequence of patterns from the pattern library (CYCLE).
5. Programming of complex sequences of line test signals and patterns (CYCLE and GOTO).

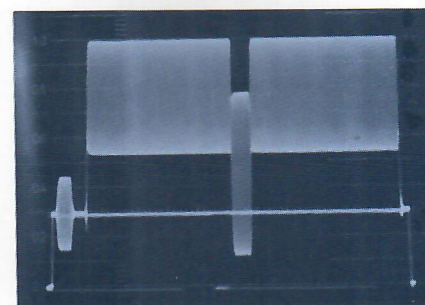
In all cases modifications can be applied to the individual signals or patterns in accordance with the FUNCTION facility.

## Electrical characteristics

**COMPOSITE VIDEO** — Luminance signals = 100% = 700 mVpp  $\pm$  1%, sync pulses: 300 mVpp  $\pm$  2%. Colour burst: 300 mVpp  $\pm$  2%. Linearity of luminance signal: better than 99%. Differential gain: less than 2%. Differential phase: less than 1°. Signal-to-noise ratio: > 52 dBms.



B-Y/R-Y test signal.



Yellow-red-yellow signal.

								NO	FUNCT.
8	7	6	5	4	3	2	1		
					VCR PULSE	NON-INTERL. ODD	NON-INTERL. EVEN	1	SY • sync
				DEV. 2 NEG	DEV. 1 NEG	DEV. 1 POS	DEV. 2 POS	2	LF • line freq
		ANTI PAL	PAL OFF	R-Y OFF	B-Y OFF	NTSC	BURST OFF	3	EN • encoder
					CLAMP BLACK LEVEL	VIDEO NEG	LUM FILTER OFF	4	VI • video
						DEV. POS	DEV. NEG	5	SU • subc
R MEM	G MEM	B MEM	Y MEM	R OFF	G OFF	B OFF	Y OFF	6	SP • spec
		LINE TIME CHG	LINE TIME EN	WHITE LEVEL KEY	BLACK LEVEL KEY	SYNC. DIST 1	SYNC. DIST 0	7	AX • auxil.
					CHROMA LEVEL CNTRL	EXT. Y IN	SECAM IN	8	EX • ext



**COLOUR ENCODER** — All signals are generated on Y-R-G-B basis. The luminance signal can be Y or  $Y = 0,30 R + 0,59 G + 0,11 B$ . Matrixing inaccuracy: less than 1%. Time difference luminance/chrominance: < 10 ns. Subcarrier suppression: > 46 dB. Phase inaccuracy: < 1°. Distortion of chroma signal: < 1%.

### Outputs

**Y, R, G, B OUTPUTS** — Number of outputs: 1 of each at the rear. Output level: 0.7 Vpp. Output impedance: 75 Ω.

**COMPOSITE VIDEO** — Number of outputs: 1 at the front, 1 at the rear. Output level: 1 Vpp. Output impedance: 75 Ω.

**COMPOSITE SYNC** — Number of outputs: 1 at the front, 1 at the rear. Output level: 2 Vpp. Impedance: 75 Ω.

**LINE DRIVE** — Number of outputs: 1 at the front. Output level: 2 Vpp. Impedance: 75 Ω.

**FIELD DRIVE** — Number of outputs: 1 at the front, 1 at the rear (V-sync). Output level: 2 Vpp. Impedance: 75 Ω.

**SUBCARRIER** — Number of outputs: 1 at the rear. Output level: 2 Vpp. Impedance: 75 Ω.

### Inputs

**COMPOSITE VIDEO** — Input level: 1 Vpp nominal. Impedance: 75 Ω.

**LEVEL (AM)** — Input level: ± 5 Vpp. Impedance: 75 Ω.

**EXTERNAL LUMINANCE** — Input level: ± 5 Vpp. Impedance: 75 Ω.

**LTC PULSE** — Logic level "0": 0-0.8 V. Logic level "1": 2.5-20 V. Impedance: > 1 KΩ.

### Sync pulse generator

Colour subcarrier (nom): 4.433 618 75 MHz ± 3 Hz. Horizontal line frequency: Derived from colour subcarrier. Number of lines per frame (nom): 625. Offset colour subcarrier frequencies: + 300 and - 300 Hz ± 3 Hz. Offset horizontal line frequencies: -8%, -4%, +4% and +8% of nom. frequency. Accuracy: ± 25 Hz.

### Remote control

All functions can be remotely controlled via the IEC bus interface.

### Power supply

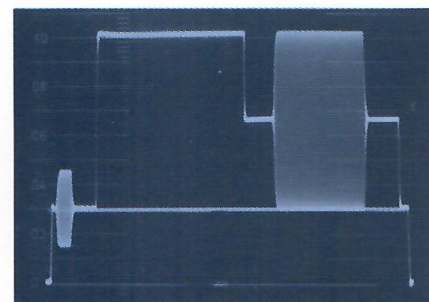
Voltage: 220 V ± 10%. Frequency: 50 Hz nominal. Consumption: 100 W at 220 V.

### Temperature range

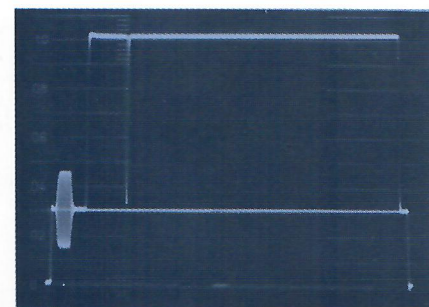
Operating: 10° - 45° C ambient.

### Cabinet

The PM 5549 is supplied in a table cabinet with feet.



White bar + chroma bar.



Inverted 2T pulse.

### Mechanical data

6U high 19" rack cabinet.  
 Height : 266 mm  
 Width : 505 mm  
 Depth : 310 mm  
 Weight : 25 kg

