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I - SCOPE

Model 981 test pattern generator delivers a variety of high quality signals, allowing to perform the many test and alignments required for satisfactory operation of television systems (TV receivers, video recorders, video projectors, monitors, camcorders...), as well as cable television equipment.

As useful in a workroom as in the field thanks to its light weight and its carrying handle, it will satisfy the most exigent experts.

II - TECHNICAL SPECIFICATIONS

II-1 VIDEO signals

A - Synchronisation

- Clock drive by 27 MHz Xtal.
- Accuracy : ± 50 ppm
- Horizontal frequency : $15\,625 \pm 0,2$ Hz (PAL - SECAM), $15\,734,2 \pm 0,2$ Hz (NTSC)
- Field frequency : 50 Hz (PAL - SECAM), 59,94 Hz (NTSC)
- Line number : 625 (PAL - SECAM) et 525 (NTSC)
- Interlacing : 2/1
- All basic signals comply with CCIR ITU-R standards.

B - Picture signal . .

- Automatic storage of the last used configuration .
- Available formats : 4/3 and 16/9

a / basic pattern

- 1 - Philips pattern .
- 2 - Purity pattern : white (100 %), blue, red, MHz green, yellow, cyan, magenta, black.
- 3 - 8 bar patterns 75 % with white at 100 %.
- 4 - Split screen pattern : upper half = colour bar , lower half = grey scale.
- 5 - White cross hatch / black ratio 18 % 13,5 (4/3), 24 % 13,5 (16/9)
- 6 - Character page " E " white / black.
- 7 - line slope.

- 8 - White square at the cross hatch centre .
- 9 - Sine wave multiburst : 0.5 - 1 - 2 - 3 - 4 - 4,8 MHz
- 10 - Cross hatch with circle and central cross .

b / Auxiliary patterns

- 1 A - Options : specific pattern , Text, logo on customer's request .
- 2 A - VCR test pattern with moving white square on 8 Positions every field .
- 3 A - Colour bar pattern .
- 4 A - Black and white vertically split screen areas
- 5 A - Black and white cross hatch .
- 6 A - Black and white " E " character page.
- 7 A - White dots pattern .
- 8 A - Blinking white rectangle with Cross hatch .
- 9 A - Black dots pattern ..
- 10 A - Cross hatch and diagonal lines.

NOTA: Three non-standard test lines : 22, 23, 335.

C - SECAM system .

- 2 signals $D'R = -1,9 (E'R - E'Y)$ and $D'B = 1,5 (E'B - E'Y)$ Pre-emphasised, filtered, peak limited , are line sequentially transmitted to a modulated subcarrier frequency.
- Subcarrier frequencies : $Fo B = 4,250 \text{ MHz} \pm 2 \text{ KHz} (272 \text{ Fh})$
 $Fo R = 4,40625 \text{ MHz} \pm 2 \text{ KHz} (282 \text{ Fh}).$
- Anti-cloche filter centred on : $4,286 \text{ MHz} \pm 20 \text{ KHz}$
- Line identification : $F0$ subcarrier burst on the front porch of line suppression according to standard .
- Subcarrier amplitude on white bar :
 $D'B = 166 \text{ mV} \pm 10 \%$ (Calibrated video signal 1 Volt peak to peak / 75Ω).
 $D'R = 206 \text{ mV} \pm 10 \%$

D - PAL system .

- 2 vectors $E'U$ et $\pm E'V$, filtered , chrominance subcarrier simultaneously modulated according to standard .
- Subcarrier frequency : $4,433 619 \text{ MHz} \pm 5 \text{ Hz} (283,7516 \text{ Fh}).$
- Burst start: $5,8 \pm 0,1 \mu\text{s}$ after line pulse .
- Burst duration : $2,25 \mu\text{s} (10 \pm 1 \text{ periods}).$
- Burst phase: $135^\circ \pm 3^\circ$.
- Burst amplitude: $300 \text{ mV} (100 \%)$ on calibrated video signal 1 V peak to peak / 75Ω .
- Vector accuracy : amplitude = 5 %, phase = 3° .

E - NTSC system .

- 2 vectors $E'U$ and $E'V$, filtered , chrominance subcarrier simultaneously modulated according to standard .
- Subcarrier frequency : $3,579545 \text{ MHz} \pm 10 \text{ Hz} (227,5 \text{ Fh}).$

F - Teletext generator .

- Channel display : 2 digits
- Automatic storage of the last used configuration .
- RF output (BNC on front panel) 10 mV / 75 Ω .
- Audio to video carrier ratio : - 14 dB.
- Attenuation : - 50 dB (continuous adjustment).

B - NICAM sound

- Carrier frequency : 5,85 MHz \pm 0,5 Hz (Systems L/L' - B/G).
- Audio to video carrier ratio : B/G = -20 dB
 L/L' = - 27 dB
- QPSK modulation .
- Audio modes : Mono - Dual - Stereo.
- Right channel interruption : 400 Hz.
- Left channel interruption : 1 KHz.
- Transmission : 728 Kbits / s.
- Pre-emphasis : CCITT J17.
- Spectral configuration : roll off 40 %.

II-3 OTHER SPECIFICATIONS

- Mains power : 230 volts \pm 10 % - 50 / 60 Hz.
- EUROPE mains input (mains cable with 2 poles + ground)
- Protection : external fuse 0,315 A - Delayed .
- Power consumption : 14 VA.
- Working temperature : + 5 à + 50 °C.
- Appearance : polycarbonat serigraphed front panel , painted epoxy metal box with carrying handle .
- Sizes : L = 396 mm
 W = 275 mm
 H = 110 mm
- CE label.
- Weight : 4 Kg .

III - FUNCTIONS DESCRIPTION .

Every function selected is indicated by the illumination of a red LED.
Front panel functions (see drawing).

- Selection KEY of 10 “ basic patterns ”, each pattern is marked by a graphic and numbered from 1 to 10. The patterns change according a clockwise loop .
- KEY marked EXT (Extension), allows to select 10 additional patterns .
- Composite video signal output (BNC) : 1 V peak to peak / 75 Ω .

Warning

The video output is not protected against high voltages; high voltage may damage the output transistor .

- Attenuator “ LEVEL ”, allows to reduce by 50 dB the RF output signal

- Display of the selected channel : 2 digits display (7 segments)
See Table at the end of the manual.

- Channel Up key

- Channel Down key

A constant pressure on one of these keys speeds up the channel search .

- Terrestrial and cable key channel selection (see table at the end of the manual).

- RF system selection key

4 possible systems : L/L' - B/G - D / K / K' - I

For each system, a “ channel / frequency ” correspondence table is at the end of the manual .

- RF output .

Max. level j 10 mV (picture carrier).

- NICAM selection key , Dual - Stereo- Mono (system B/G and L/L')

When the two LEDs are “off” , there is no NICAM carrier (MONO mode).

- Audio signals selection KEY .

L (Left channel) - 1 KHz

R (Right channel) - 400 Hz

L + R (dual) - 2 LEDs lighted

OFF - 2 LEDs are off .

- Selection KEY for slow or fast switching voltage for PERITEL outputs .

- Slow switching for CVBS : + 12 V : format 4/3
+ 6 V : format 16/9

- Fast switching for RGB : + 3 V

- Selection KEY of 4/3 or 16/9 picture format.

- Selection KEY of video system .

PAL

SECAM

NTSC - 2 LED lighted

When the two LEDs are off , the video signal is in black and white mode (no chrominance subcarrier) .

Video NTSC system is only possible with colour bar pattern n° 3 . On this position all the colours are inverted (White to the right) compared to PAL and SECAM.

- Key control of colour primary BLUE .
- Key control of colour primary GREEN .
- Key control of colour primary RED .

The KEYS Are only working for the following pattern :

* n° 2 - n° 3 - n° 5 - n° 6 - n° 8 - n° 10

* n° 1 A - n° 2 A - n° 3 A - n° 4 A - n° 5 A - n° 6 A - n° 7 A - n° 8 A - n° 9 A - n° 10 A

- Mains power switch .
- The Handle allowing transportation and also inclination for best sight of the function controls and indicators .

NOTA:

Automatic storage of the last called configuration allows to find it again after switch off and switch on again . For the RF modulator , 4 channels are stored one for each system .

Back side configuration of the SET : (see drawing)

- Mains power input “ EUROPE standard ” 2 pôles + ground, with fuse socket
- (fuse 0,315 A - delayed) .

- Socket “ EURO - PERITEL ” 20 pins.

* pin 1 : Output of right channel sound .

Frequency : 400 Hz - Level 1,5 V Peak to peak / 10 K Ω .

* pin 3 : Output of left channel sound .

Frequency : 1 kHz - Level 1,5 V Peak to peak / 10 K Ω .

* pin 7 : Output signal of the primary Blue Level 1 V Peak to peak / 75 Ω .

* pin 11 : Output signal of the primary Green Level 1 V Peak to peak / 75 Ω .

* pin 15 : Output signal of the primary Red Level 1 V Peak to peak / 75 Ω .

* pin 19 : Output of the positive CVBS Level 1 v Peak to peak / 75 Ω .

* pin 8 : Output of the slow switching signal .

+ 6 V / 4,7 K Ω - format 16/9 .

+12 V / 4,7 K Ω - format 4/3 .

* pin 16 : Ouput of the fast switching signal .

+ 3 V / 75 Ω

these two last pins are controlled from the front panel and the two KEYS .

- mini-DIN socket (USHIDEN) 4 pins

Outputs of the “ Y/C ” signals compliant with S-VHS standard

Y+Sync level : 1 V Peak to peak / 75 Ω

Chrominance level : 0,3 V Peak to peak / 75 Ω (Tested on PAL burst)

IV - BUILT-IN UNITS

All the functional boards of the 981 Pattern Generator are fixed on a metallic chassis.

IV-1 Under the chassis .

A - Mains power supply .

Regulated mains power supply 230 Volts \pm 10 %, 50 - 60 Hz.

Mains consumption : 14 VA

Including :

* One toro transformer providing two secondary voltages 8,5V and 15V

* One board providing two DC regulated voltages +12 V and + 30 V .

B - Peritel board .

One “ PERITEL ” board providing the different signals for the 20 pins socket

Functions of this board :

- Generator of 2 audio frequencies 400 Hz on right channel and 1 KHz on left channel .
- Adaptation of the composite video and RGB coming from the digital video board .
- The potentiometer located on this board allows the audio signal level adjustment for the RF modulator .

C – Microprocessor board .

This board contains the microprocessor which controls all functions of the 981 generator by means of the front panel keyboard .

D - Modulator unit

The RF MODULATOR generates and modulates the picture and sound carrier frequencies for systems L/L' - B/G - I - D/ K /K'.

The RF signal is supplied to the output socket through an attenuator located on the front panel .

IV-2 Above the chassis

A- Digital and encoder board

This board delivers all video signals for the 981 pattern generator. This board is based on memories, which by means of a large scale integration PLD and a digital encoder generate luminance and chrominance signals for SECAM - PAL and NTSC systems.

This board generates also the two low voltage supplies : + 3,3 Volts and +5 Volts.

Two potentiometers allow :

- 3,3 Volts adjustment .

- Level adjustment of the video signal for the RF modulator .

B - NICAM unit



Two boards are used to deliver the NICAM 728 signal.

* The “ GENICAM ” board provides digital audio tones at 400 Hz and 1 kHz

* The “ QPSK ” board provides the 5,85 MHz NICAM subcarrier to the RF modulator stage.

IV-3 KEYBOARD UNIT .

This board is located and fixed behind the front panel and allows the control of all functions through the microprocessor unit

IV-4 TELETEXT

(See technical specifications)

The teletext is operating with all patterns . It is off when the chrominance carrier is switched off with KEY control

V - PATTERN DESCRIPTION .

1 - KEY

Pattern #	PATTERN TYPE	PURPOSE
1	Complex pattern - EBU type	Global quality of the equipment under test
2	Purity pattern obtained with keys * three fundamental colours: Blue- Green - Red * three complementary colours : Yellow - Cyan - Magenta Black - White	* Colour uniformity * Colour AGC * Chrominance white * Synchronisation
3	Colour bar pattern * PAL and SECAM amplitude 100 / 0 / 75 / 0 * NTSC amplitude 7,5 / 75 / 7,5 / 100	* Colours quality * SECAM - PAL - NTSC identification • Subcarrier generation * Matrixing * Red, Green ,Blue * Saturation
4	Split picture * Upper half: Colour bar pattern * Lower half: grey staircase	Luminance / chrominance delay
5	* Black and white cross-hatch * Ratio 18%13,5 format 4/3 * Ratio 24%13,5 format 16/9 * Format indication at the upper left of picture	* Static convergence * Dynamic convergence * cushion distortion * E/W-N/S correction 110 ° TV set * Yoke direction
6	Black and white E page .	* Focus * Block type readability
7	Line slope	* Video amplifier linearity . * Digital signal quality
8	* Black and white cross-hatch with white square at the centre . * Format indication at the upper left of picture	* EHT internal resistance * Yoke direction

9	* Sinus multiburst * Frequencies : 0,5 - 1 - 2 - 3 - 4 - 4,8 MHz	* Video base band
10	* Black and white cross-hatch with circle and centred cross * Formats 4/3 et 16/9 control by KEY * Format indication at the upper left of picture	* Geometry - Linearity adjustment * Yoke direction

2 - KEY

Pattern #	PATTERN TYPE	PURPOSE
1 A	Specific pattern on request , text, logo	Depending on option
2 A	VCR test pattern 4 horizontal areas a/ White 100% b/ Colour bar pattern c/ Frequency multiburst : 0,5 - 1 - 2 - 3 - 4 - 4,8 MHz d/ 8 positions moving white window at the bottom of the screen .	* White level adjustment * Chrominance circuit * Video base band * Still picture. Step by step picture * Slow and fast * Head position
3 A	Horizontal Colour bar pattern	Matrixing
4 A	Vertical black and white split screen	EMC measuring
5 A	Black and white cross hatch	* Geometry . Black and white transitions * Pre-correction
6 A	Black and white E page	* Corner focus
7 A	Black and white dots	* Focus * Astigmatism distortion * Static convergence
8 A	Black and white cross-hatch with switching on/off white window at the centre	EHT dynamic resistance “ Pumping ”
9 A	Black dots	Focus
10 A	Black and white cross-hatch with diagonal Format indication at the UP-RIGHT	* Geometry * Horizontal yoke position * Angles linearity * Yoke direction

VII - CORRESPONDENCE TABLES SYSTEMS - CHANNELS - FREQUENCIES

TERRESTRIAL CHANNELS				
SYSTEM	L /L'	B/G	D/K/K'	I
Display CHANNEL N°	Picture carrier (MHz)	Picture carrier (MHz)	Picture carrier (MHz)	Picture carrier (MHz)
2	55,75	48,25	52,25	53,75
3	60,50	55,25	60,25	61,75
4	63,75	62,25	175,25	175,25
5	176,00	175,25	183,25	183,25
6	184,00	182,25	191,25	191,25
7	192,00	189,25	199,25	199,25
8	200,00	196,25	207,25	207,25
9	208,00	203,25	215,25	215,25
10	216,00	210,25	207,25	223,25
11	189,25	217,25	215,25	231,25
12	224,00	224,25	223,25	231,25
21	471,25	471,25	471,25	471,25
22	479,25	479,25	479,25	479,25
23	487,25	487,25	487,25	487,25
24	495,25	495,25	495,25	495,25
25	503,25	503,25	503,25	503,25
26	511,25	511,25	511,25	511,25
27	519,25	519,25	519,25	519,25
28	527,25	527,25	527,25	527,25
29	535,25	535,25	535,25	535,25
30	543,25	543,25	543,25	543,25
31	551,25	551,25	551,25	551,25
32	559,25	559,25	559,25	559,25
33	567,25	567,25	567,25	567,25
34	575,25	575,25	575,25	575,25
35	583,25	583,25	583,25	583,25
36	591,25	591,25	591,25	591,25
37	599,25	599,25	599,25	599,25
38	607,25	607,25	607,25	607,25
39	615,25	615,25	615,25	615,25
40	623,25	623,25	623,25	623,25
41	631,25	631,25	631,25	631,25
42	639,25	639,25	639,25	639,25
43	647,25	647,25	647,25	647,25
44	655,25	655,25	655,25	655,25
45	663,25	663,25	663,25	663,25

TERRESTRIAL CHANNELS				
SYSTEM	L /L'	B/G	D/K/K'	I
Display CHANNEL N°	Picture carrier (MHz)	Picture carrier (MHz)	Picture carrier (MHz)	Picture carrier (MHz)
46	671,25	671,25	671,25	671,25
47	679,25	679,25	679,25	679,25
48	687,25	687,25	687,25	687,25
49	695,25	695,25	695,25	695,25
50	703,25	703,25	703,25	703,25
51	711,25	711,25	711,25	711,25
52	719,25	719,25	719,25	719,25
53	727,25	727,25	727,25	727,25
54	735,25	735,25	735,25	735,25
55	743,25	743,25	743,25	743,25
56	751,25	751,25	751,25	751,25
57	759,25	759,25	759,25	759,25
58	767,25	767,25	767,25	767,25
59	775,25	775,25	775,25	775,25
60	783,25	783,25	783,25	783,25
61	791,25	791,25	791,25	791,25
62	799,25	799,25	799,25	799,25
63	807,25	807,25	807,25	807,25
64	815,25	815,25	815,25	815,25
65	823,25	823,25	823,25	823,25
66	831,25	831,25	831,25	831,25
67	839,25	839,25	839,25	839,25
68	847,25	847,25	847,25	847,25
69	855,25	855,25	855,25	855,25

CABLE CHANNELS			
SYSTEM	L /L'	B/G	D/K
Display CHANNEL N°	Picture carrier (MHz)	Picture carrier (MHz)	Picture carrier (MHz)
1	120,00	105,25	103,25
2	128,00	112,25	111,25
3	136,00	119,25	119,25
4	144,00	126,25	127,25
5	152,00	133,25	135,25
6	160,00	140,25	143,25
7	168,00	147,25	151,25
8	224,00	154,25	159,25
9	232,00	161,25	167,25

CABLE CHANNELS			
SYSTEM	L /L'	B/G	D/K
Display CHANNEL N°	Picture carrier (MHz)	Picture carrier (MHz)	Picture carrier (MHz)
10	240,00	168,25	231,25
11	248,00	231,25	239,25
12	256,00	238,25	247,25
13	264,00	245,25	255,25
14	272,00	252,25	263,25
15	280,00	259,25	271,25
16	288,00	266,25	279,25
17	303,25	273,25	287,25
18	315,25	280,25	295,25
19	327,25	287,25	303,25
20	339,25	294,25	303,25
21	351,25	303,25	303,25
22	363,25	311,25	311,25
23	375,25	319,25	319,25
24	387,25	327,25	327,25
25	399,25	335,25	335,25
26	411,25	343,25	343,25
27	423,25	351,25	351,25
28	435,25	359,25	359,25
29	447,25	367,25	367,25
30	459,25	375,25	375,25
31	116,75	383,25	383,25
32	128,75	391,25	391,25
33	140,75	399,25	399,25
34	152,75	407,25	407,25
35	164,75	415,25	415,25
36	176,75	423,25	423,25
37	188,75	431,25	431,25
38	200,75	439,25	439,25
39	212,75	447,25	447,25
40	224,75	455,25	455,25
41	236,75	463,25	463,25
42	248,75	69,25	463,25
43	260,75	76,25	463,25
44	272,75	83,25	463,25
45	284,75	90,25	463,25
46	296,75	97,25	463,25